The New England JOURNAL of MEDICINE

FORMERLY THE BOSTON MEDICAL AND SURGICAL JOURNAL

Official Organ of The Massachusetts Medical Society
The New Hampshire Medical Society — The Vermont State Medical Society
The New England Surgical Society — The Boston Surgical Society, Inc.
The New England Pediatric Society — The New Hampshire Surgical Club
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OWNED AND PUBLISHED BY THE MASSACHUSETTS MEDICAL SOCIETY

Volume 205 Number 7 | Domestic $6 per Annum, 25c per Copy Canada $7.04, Foreign $7.56 | AUGUST 13, 1931 | Published Weekly in Boston at 165 Newbury Street

Hospital Library

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The New England
Journal of Medicine

VOLUME 205 AUGUST 13, 1931 NUMBER 7

THE MANAGEMENT OF PEPTIC ULCER

BY FRANK H. LAHEY, M.D.*†

As an introduction to a consideration of the subject of peptic ulcer, there is perhaps nothing more illuminating than a brief summary of medical thought on this subject during the past century. Hurst's excellent review of the history of ulcer study records pathological description of peptic ulcers by Marcellus Donatus in 1586, Littré in 1704, Rawlinson in 1729, and Penoda in 1793. The first description of symptoms was by Baillie in 1799. Abercrombie in 1828, and Cruveillier in 1829 made a distinction between gastric ulcer and gastric carcinoma. Brinton thoroughly discussed gastric ulcer in 1857, but mentioned duodenal ulcer as a sequela of severe burns, a lesion which he described as "essentially different from ulcer of the stomach." The characteristic food relief and periodicity of the symptoms were accurately described by Abercrombie, and in 1887 Bucquoy reiterated Abercrombie's description of the symptoms and the possibility of diagnosis of the condition from these symptoms. However, the importance of the disease was still not sufficiently recognized in the early years of our century, when duodenal ulcer was considered a much less frequent disease than gastric ulcer. From these false teachings, the popular term "stomach ulcer" came into common use. However, between the years 1901 and 1905, Moynihan and other surgeons demonstrated at the operating table the frequency of duodenal ulcer. In the last fifteen years, radiological examinations have supplemented the work of the surgeons in the development of the clinical picture of ulcer, and we find ourselves at present with a considerable knowledge of the incidence, location, characteristics, and life history of the disease, but still searching for the basic cause.

The incidence of duodenal ulcer as compared with that of gastric lesions, though considered in the early study of ulcer to be much less, since the careful investigation of the duodenum by surgeons and the development of x-ray, has been found to be much greater. In our Clinic, duodenal ulcer is found ten times as often as gastric ulcer. The incidence of male and female is in our duodenal group three male and one female, and in the gastric group the incidence of male and female is equal. The general incidence of the disease, peptic ulcer, is difficult to estimate because of the tendency of the disease to spontaneous healing. Stuart's autopsy statistics covering 4000 autopsies at Leeds General Infirmary showed chronic ulcer, healed or unhealed, in almost 10 per cent. A familial tendency to ulcer has been frequently noted in the literature, and we have also been impressed by this finding. We have among our cases a mother and daughter both with gastric ulcer; two brothers, and a father and son with duodenal ulcers, and many patients with ulcer give a history of this disease in their forbears and brothers and sisters.

The characteristics of peptic ulcer are now so well known and the disease so frequently diagnosed that it seems remarkable that it has come into common knowledge only in the past twenty or thirty years. It is a recognized fact that a peptic ulcer may be acute and may have as its first symptoms the complications of hemorrhage and perforation, without a subsequent chronic ulcer. On the other hand, the acute ulcer frequently fails to heal and develops into the chronic lesion which, probably because of its power to heal partially, causes only intermittent symptoms. The outstanding clinical characteristic of peptic ulcer is the periodicity of symptoms and distress occurring at a certain period after intake of food. This distress seems to be associated with the presence of free hydrochloric acid and muscular spasm, and to be relieved by the neutralization of the acid or the release of spasm.

Gastric and duodenal ulcer occupies a very important position in the list of diseases for which patients come to our Clinic, since at least half of the patients admitted to the gastro-intestinal service believe they may have an ulcer, and one out of every 23 patients who came to the Clinic on all services last year proved to have this condition.

In the Clinic in the past 7 years, the following cases have been diagnosed as ulcer:

916 duodenal
100 gastric
53 gastro-jejunal, a total of 1069 ulcer patients, of which 918 were treated.

*This paper bears my name only since the invitation to present it at the annual meeting of the Suffolk District of the Massachusetts Medical Society, held in the Boston Medical Library on April 29, 1931, came to me as an individual. It must be appreciated, however, that it is a presentation of the combined and coöperative work in the Clinic between the gastro-enterological department, Dr. Sara M. Jordan, Dr. Everett B. Kiefer, Dr. S. A. Wilkinson, and the surgical department, the author, Dr. H. M. Clute, and Dr. R. B. Cattell. It would be wrong for me to read or publish this paper without gratefully acknowledging the part they have played in the establishment of this plan and in the management of this group of cases.

†Lahey—Director, Lahey Clinic. For record and address of author see "This Week's Issue", page 359.

The origin of gastric and duodenal ulcer is still obscure. We do not know what causes it. We are not able to reproduce the chronic lesion experimentally. The two lesions, gastric ulcer and duodenal ulcer, are apparently quite similar processes. They sometimes are found in the same patient, but frequently lack an important similarity in that duodenal ulcers tend to be associated with higher gastric acids than do gastric ulcers. We have nothing to add to knowledge of the origin of gastric and duodenal ulcer, but we wish to stress what we have repeatedly stated, that there are certain features quite regularly associated with gastric and duodenal ulcer, and that while these features may well be the result and not the cause of gastric and duodenal ulcer, nevertheless they are at least the cause of the persistence of symptoms of peptic ulcer. Furthermore, relief from symptoms and healing of the lesion cannot be accomplished until these factors are controlled or eliminated.

The presence of high content of hydrochloric acid as demonstrated by gastric analysis or evidenced by pyrosis, or assumed from the time relationship of the distress to the height of digestion, together with the consistent relief of pain by food and alkalies, establishes the factor of hyperchlorhydria as a very definite element in the persistence of peptic ulcer symptoms.

Pylorospasm, as can be so definitely demonstrated fluoroscopically during the active stages of peptic ulcer, is also a most important factor in the continuation of peptic ulcer symptoms, and while one cannot settle upon the order of appearance, it is quite possible that pylorospasm follows the appearance of the ulcer (whatever its cause) and precedes the hyperchlorhydria. Once pylorospasm is established, two factors are at once present for the production of hyperacidity; the failure of alkaline duodenal contents to be regurgitated into the stomach, thus lowering the acidity of its contents and likewise the hyperaccumulation of highly acid gastric contents with prolonged contact upon peptic ulcers and the ejection into the duodenum of gastric contents of more highly acid character than it is equipped to neutralize. Recent investigations have also shown the importance of the presence of adequate amounts of mucin, now to be regarded as an important constituent of gastric contents. All these chemical and mechanical factors which operate in the persistence of ulcer symptoms are probably of secondary importance in the basic causation of peptic ulcer. Although our thought on the subject of basic etiology is still based on theory, since experimental work up to the present does not carry us beyond the mechanical and chemical causes, yet it seems logical to assume that constitutional and neurogenic factors furnish a very important etiological basis.

Whatever the cause of ulcer, the fact that patients are frequently relieved of their symptoms and, in many cases, their ulcers healed by measures directed against hyperacidity and pylorospasm, the fact that most gastric ulcers are on the so-called main pathway (Magenstrasse) and most duodenal ulcers are located at a point corresponding to that which highly acid gastric contents would strike on being expelled from the stomach through the pylorus, make it essential that these two factors must be overcome by whatever method of treatment, operative or non-operative, is undertaken in its management.

As to the diagnosis of gastric and duodenal ulcer, but little need be said except to urge that no diagnosis of gastric and duodenal ulcer be made except upon the fullest evidence, history, fluoroscopy, gastric analysis and search for occult blood in the stools. So often can hyperacidity and hunger distress be associated with conditions not due to ulcer, and so difficult at times is the diagnosis of ulcer in doubtful cases, that every diagnostic resource should be exhausted in arriving at a conclusion in these conditions which demand for their care either an operation of considerable magnitude or a non-operative plan requiring adjustments in habits and diet which are likewise of considerable seriousness.

With the diagnosis of gastric or duodenal ulcer established, what course should one pursue in its management? I feel certain that I may properly ask to be forgiven a pardonable pride in the part the Clinic has played in helping to bring about a conservative attitude toward the management of gastric and duodenal ulcer, with the result that there are few places left, especially in New England today, where it is assumed that the primary method of treatment of these lesions is surgical.

We have assumed the position in the Clinic that all ulcers, excepting those with perforation, are primarily medical and that they become surgical only as they fulfill certain requirements to be mentioned below.

While the medical profession knows but very little as to the cause of ulcer, and is not entirely in accord as to the best method of surgical treatment when that measure becomes indicated, it has not in the past made the most of its opportunities in the medical management of this condition. We have realized that it is possible in certain instances to treat ambulant patients with gastric and duodenal ulcer somewhat satisfactorily, but that a period of rest in bed provides three very important factors in the management of this condition. It impresses the patient's mind with the fact that the non-operative plan of management is really of such importance as to demand that time and readjustment of habits be given to it; secondly, it makes the immediate control of ulcer symptoms easier to attain during the stage of their activity when patients so frequently seek medical help; and thirdly, and probably of the greatest importance

when practiced in a clinic where ulcer patients are treated in groups, it provides education to the patient as to habits of work and rest, as well as dietary control. Without careful follow-up, check-up, and educational training, all non-operative plans of management of gastric and duodenal ulcer are doomed to a high percentage of failures.

We, therefore, accept no patients in the Clinic except those who will subscribe to the following plan of management—that they will go to bed in the hospital under hospital régime for a period of three weeks; that they will submit to weekly gastric aspirations to ascertain whether or not they are being kept completely neutralized by the neutralization treatment; that they will be fluoroscoped regularly during their stay in the hospital in order that any changes in the ulcer itself may be noted and in order that relief or non-relief of pylorospasm may be noted. In contrast to the findings recently reported by Emery and Monroe, we have found the radiological changes in the duodenum as well as on the lesser curvature of the stomach during the period of treatment, of definite prognostic significance. Patients must also agree that they will return to the Clinic once every two months for a check-up examination, consisting of gastric analysis, fluoroscopy, and a report of their condition and symptoms in the interval between check-up examinations, until it is established that they are quite well or have so failed to fulfill the requirements of this plan of procedure that surgery is indicated.

Under the following conditions, we believe that surgery becomes advisable: First, when, in spite of accurate adherence to the medical plan of management, the patient is not relieved of pain, or when bleeding, obstruction, or perforation occurs during the management, and when in gastric ulcer the question of carcinomatous degeneration in the ulcer arises.

If relief of pain is not obtained by good non-operative management, it is obvious that only surgery remains, and its risks become justifiable.

In the matter of hemorrhage, we have repeatedly stated that unless recurrent bleeding compels immediate operation, there is no time when patients are less well equipped to endure gastric operations; there is no time when the mortality of gastric operations will be higher than immediately after massive hemorrhages.

The mortality of bleeding from gastric and duodenal ulcers is probably not more than two per cent. in reasonably treated patients, and it is wiser with all patients, except those with repeatedly recurring hemorrhages, to delay operative procedures until the immediate effects of the hemorrhage have been overcome, and the patient has regained, at least in some measure, his or her vascular balance.

Patients who show bleeding from their ulcers as the result of non-adherence to the dietary régime, should not necessarily be operated upon at the first bleeding, but should be warned of their danger, urged to adhere strictly to the dietary scheme, and operation urged if bleeding recurs, whether or not there has been adherence to the scheme of management. Our statistics show that the ultimate results of medical management in cases having two or more hemorrhages are poor.

Pyloric obstruction used to be an immediate indication for surgical treatment of gastric and duodenal ulcer. In 29 patients showing pyloric obstruction on entrance to the Clinic in the past six years, but 14 have required operation. In the remainder, the obstruction has been overcome by rest, neutralization, and diet, so that surgery was not necessary and the stomach has emptied satisfactorily. We have learned that many cases of pyloric obstruction occurring in patients during the acute stages of their ulcer are the result of edema and spasm at the pylorus, and that such a condition is not an indication for immediate surgery, since so many of these cases are relieved of their obstruction by non-operative measures.

Perforation is so certainly and immediately a surgical condition that it requires no discussion.

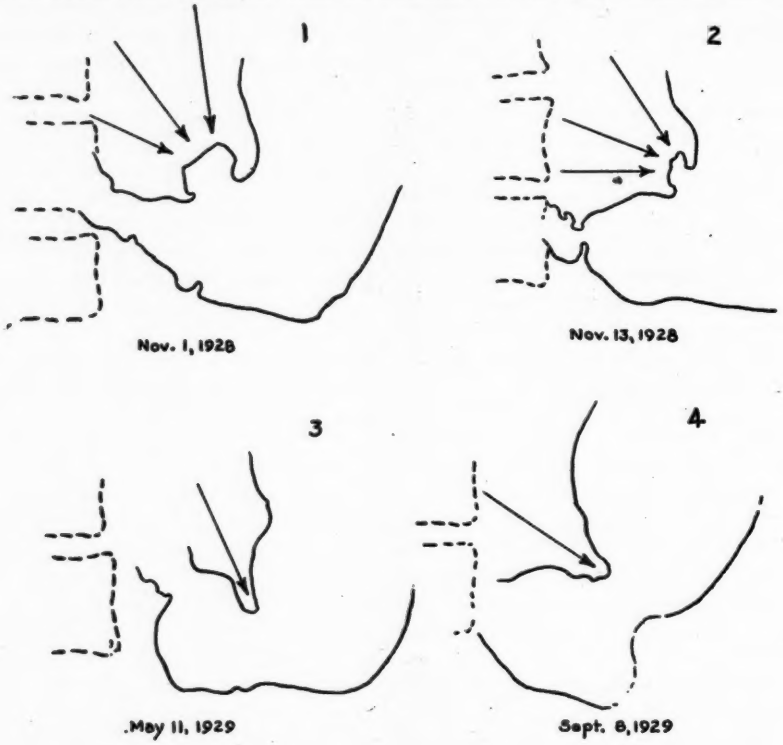
The fear of malignant degeneration in a gastric ulcer, together with the attitude that gastric ulcer is non-healable medically, has been the cause of the very frequently assumed position that it is justifiable to treat a duodenal ulcer medically, but it is not proper to treat a gastric ulcer medically. This position is, in our opinion, quite wrong and has resulted in a large number of unnecessary gastric operations, and in all probability a considerable number of unnecessary deaths in patients who did not have carcinoma in their ulcers and whose ulcers were healable by non-operative measures. We believe that considerably less than ten per cent. of gastric ulcers show malignancy, and that under the plan practiced by Dr. Sara M. Jordan in this Clinic, a great majority of the patients who have malignancy in their lesion can have it demonstrated, and in a quite reasonable time, by this plan of hospital observation while under medical management.

Gastric lesions are divided into three groups: those which are frankly malignant, and they can be readily diagnosed by history and especially by the rigid appearance fluoroscopically of the gastric wall at the site of the lesion, so that there is very little question about them; those which are early malignancy with gastric acid still present; and those in which the ulcer is intractable, non-healable, but without malignancy. In the first group, those frankly malignant, no observation is necessary. One needs only to determine whether the lesion is removable and the patient able to withstand the operative procedure.

It is in the next two groups that such incorrect attitudes have been assumed, in our opin-

ion. Gastric ulcer has very properly been looked upon with suspicion because of its association with gastric cancer. If the incidence of malignancy associated with gastric ulcer is ten per cent. or under, that is one in ten to one in sixteen, then no one who is dealing with these conditions can fail to be impressed with the responsibility of ridding the patient with gastric ulcer of this danger. However, the position that be-

In our endeavor to overcome this undesirable situation, and to obtain help in segregating those healable gastric ulcers from those which were non-healable, and those containing malignancy, the plan, the results of which Dr. Jordan has published, was developed and has proven of the greatest value in helping us distinguish those patients with gastric ulcer who should be submitted to surgery from those who may safely



LARGE HEALABLE ULCER OF LESSER CURVATURE

M.B. Male 62 yrs.
One month's history of distress
Free H.C.L. 65
Disappearance of the niche and relief of symptoms with medical treatment.
Well - 2½ years later: no evidence of defect.

ILLUSTRATION I.

cause a patient has a lesion in which this percentage of malignancy occurs (six to ten per cent.) all gastric ulcers should be resected, is not a proper one. Furthermore, the policy that patients with such gastric ulcers should be explored to determine the presence or absence of malignancy is not a proper one, since exploration will not reveal this desired feature. Exploration in chronic gastric ulcer reveals only the indurated ulcer, and it becomes almost imperative that a surgeon resect such cases once the abdomen is opened, since his conscience will not permit him to close the abdomen of a patient with an uncertain but potentially malignant lesion. If, now, all gastric ulcers are resected, or explored and then resected, it is our opinion, based upon our experience now with 81 gastric ulcers, 83 per cent. of which have been healed medically, that many patients will have been needlessly operated upon, and of this number, certainly, a few will have died needlessly.

be submitted to non-operative measures. This provides what we have so earnestly sought and desired, non-operative criteria to which gastric ulcers may be submitted to determine their need for surgery, rather than the submission of all gastric ulcers to partial gastrectomy in order to remove the danger of malignancy in a group certainly not over ten per cent. (Ills. I and II.)

ILLUSTRATION I

These outline drawings are exact reproductions of the x-ray plates after a bismuth meal in a patient with a large eroding ulcer of the lesser curvature.

Note in 1, as indicated by the arrows, the large alcove defect. In 2, thirteen days later, its marked diminution in size under hospital medical régime. In 3, six months later, the complete disappearance of the defect, and in 4, ten months later, the normal lesser curvature as evidence that the defect has remained absent.

I have had the opportunity of feeling the healed scar of such an ulcer several times while operating upon such a patient for gallstones after non-

operative healing of the ulcer, and have found the scar soft, sound and flexible.

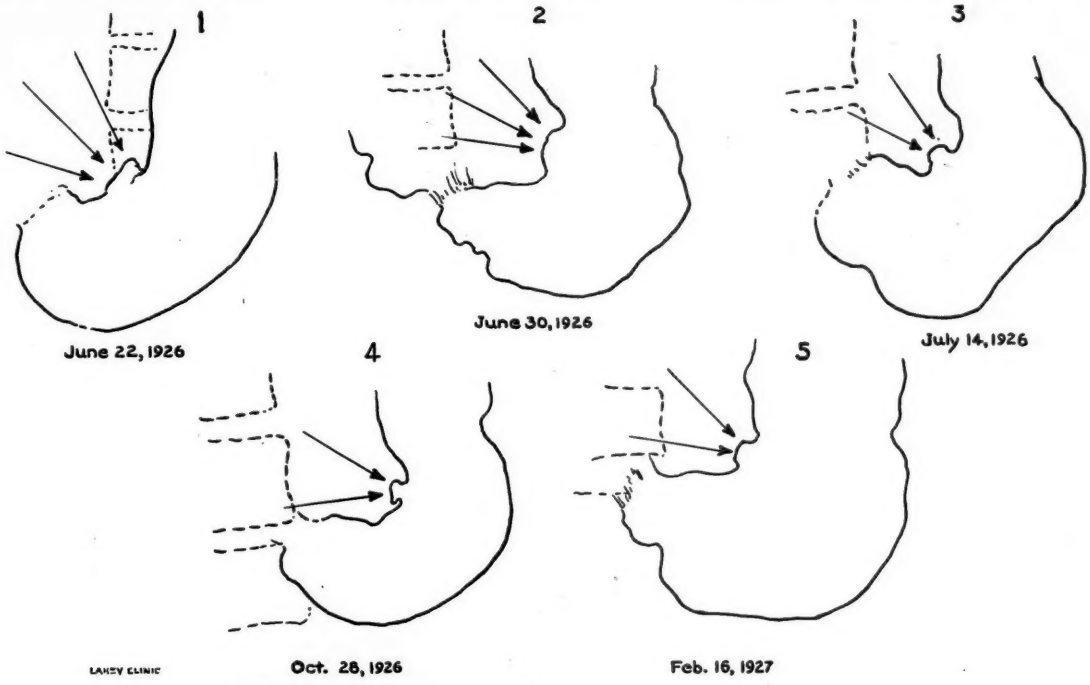
In the face of such graphic evidence of cure, and so long as such evidence of cure persists, there need be no fear of malignancy, and partial gastrectomy is not necessary.

ILLUSTRATION II

These are likewise exact outline reproductions of x-ray plates after a bismuth meal in a patient with a large unhealable eroding gastric ulcer of the lesser curvature.

Note in 1 as indicated by the arrows the alcove defect made by the ulcer on the lesser curvature; in 2, eight days later, little change in its size; in 3, twenty-two days later, some diminution in size; but in 4, four months later, a persistent alcove defect. Note in 5, eight months from the original picture, that the defect has increased in size together with a return of symptoms.

In the face of such evidence, if the patient's condition permits, nothing short of partial gastrectomy can be done, since one cannot with this evidence be sure that this lesion does not contain malignancy.



J. G Female 57 years
6 months' history
Free H.C.L. absent when first admitted later 34
No occult blood in stools
Complete relief of symptoms with hospital management

Films show
1- size of lesion before beginning treatment
2- diminution in size in 8 days
3- diminution but persistence in 7½ weeks
4- persistence of defect in 4 months
5- increased size and recurrence of symptoms in 8 months

Patient had resection

BENIGN ULCER - UNHEALABLE
ILLUSTRATION II.

By this plan, all gastric lesions which are not frankly cancer and particularly those in which gastric acid is still present, are put to bed in the hospital on accurate neutralization treatment for a period of from ten days to two weeks. If the patient can be made free from symptoms by this treatment, and occult blood can be made to disappear from the stools, and there is progressive improvement in the x-ray appearance of the ulcer, then no surgery is indicated. If under this plan of treatment it is not possible to make the x-ray defect completely disappear, if even a small dimple persistently remains, or if occult blood persists in the stools, then one must conclude that the lesion is either a malignant one or an intractable non-healable ulcer. Since an intractable ulcer is a constant source of irritation in an organ notoriously susceptible to malignancy, it is our opinion that it should be removed, and this condition, as well as one with a reasonable suspicion of already existing malignancy, calls for partial gastrectomy. This radical procedure then becomes logical, whereas, when it is applied indiscriminately to all gastric lesions, it cannot be justified. (Ill. III.)

There are a few other criteria in segregating immediately surgical gastric ulcers from those which do not need to be considered immediately surgical, such as the fact that most if not all of the lesions of the greater curvature suspected of ulcer will prove to be cancers, and posterior wall ulcers which have eroded into the pancreas will prove so extremely difficult to heal that a very high percentage of them will come to surgery.

In either gastric or duodenal ulcer, the occurrence of alkalosis is a sign distinctly unfavorable to a successful outcome under medical management, as is also the recurrence of hem-

orrhage or pyloric obstruction while under medical management.

When the possibilities of non-operative measures have been exhausted and the patient has failed to fulfill one or more of the criteria above suggested, he becomes a candidate for surgery. When, then, should the surgical management of such a patient begin?

One of the most important considerations in dealing with patients having gastric or duodenal ulcers in whom surgery is contemplated is the realization that any operation for gastric or duodenal ulcer may prove to be a long and shocking one, and that a period of preparation with plenty of fluids, glucose, and transfusion may play a considerable part in bringing the ordeal to a successful conclusion.

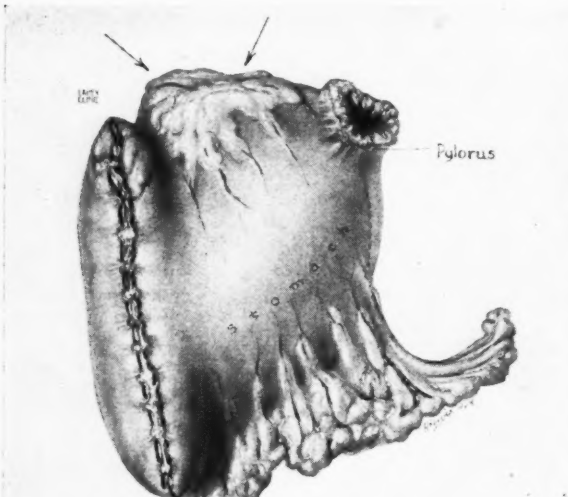


ILLUSTRATION III.

This illustration of the distal half of the stomach removed for a lesser curvature ulcer as indicated by the arrows is shown to demonstrate how the end of the stomach is closed by the mechanical sewing machine of De Petz which we have now employed in several cases and have found useful as a time-saving measure in many patients who are poor risks. Note the accurate closure of the cut end of the stomach by the mechanical metal clips, which are automatically applied by the machine.

The selection of the anesthetic is also of great importance. In our experience with stomach surgery, we have moved from ether to spinal anesthesia, and now to avertin and regional anesthesia in many of our gastric operations.

Spinal anesthesia is a delightful anesthetic because of the complete relaxation and the quiet abdominal contents which it ensures. Unfortunately, many gastric operations, particularly those involving resections, consume a period of time longer than that for which the usual spinal anesthesia will last. The addition of a general anesthesia in the form of ether, nitrous oxide or ethylene, as is so often necessary for closure of the abdomen at the end of the gastric operation, when the patient is so easily and so badly shocked, is a very undesirable situation. The employment of avertin (tribromethylol) which is placed in the patient's rectum, in his room, and allows him to be brought to the operating room soundly sleeping where regional anesthesia may then be done, has proved of the greatest satisfaction to us, and provides an anesthesia of sufficient depth and length to permit the completion of any of the gastric operations, no matter how extensive their magnitude.

Before discussing the selection of operative procedures for those patients with gastric or duodenal lesions whom we have treated as above described, but who have now become candidates for surgery, let us review for a moment the basic principles of the surgical treatment of gastric and duodenal ulcer. The basic factors by which one hopes to accomplish relief with surgery in gastric or duodenal ulcer are three: by neutralization of gastric acids due to duodenal or jejunal regurgitation, similar to that neutralization which is obtained by the administration of alkalies in medical management; by destruction or removal of the pylorus, overcoming thus the effects of pylorospasm; and lastly, by removal of the lesion itself. The three surgical procedures available for the treatment of peptic ulcer, gastroenterostomy, pyloroplasty or partial gastrectomy, all are of such character that they permit alkaline duodenal and jejunal contents to regurgitate into the stomach, mix with and reduce the acidity of gastric contents, and the best results are obtained in those cases in which the greatest degree of lowering of gastric acidity takes place. Destruction of the pylorus, preventing thus hyperaccumulation of acid gastric contents and likewise permitting regurgitation of alkaline duodenal contents accomplishes three desirable results. It not only permits alkaline duodenal contents to regurgitate into the stomach to neutralize gastric acids, but by destroying the pyloric sphincter, it does away with one of the factors at least provocative in ulcer symptoms,—that is pylorospasm. Often, if the duodenal ulcer is an anterior one, it can also be removed with pyloroplasty, and of the greatest importance is the fact that by pyloroplasty the gastric contents are still discharged into the duodenum, the segment of bowel best equipped and intended to receive them, and protect itself against the danger of recurrent ulcer.

The surgery of gastric and duodenal ulcer is divisible into operative procedures of greater magnitude, represented by partial gastrectomy, and those of lesser magnitude, represented by pyloroplasty and gastroenterostomy.

Any discussion of the surgical treatment of peptic ulcer, particularly when the patients have been carried through a plan such as we practice and have described here, must consider the two

lesions (gastric and duodenal) separately. We believe that except in those patients who are in such poor condition that it cannot be considered, partial gastrectomy is the operation which should be applied to all gastric lesions which have failed under the preliminary trial of medical management, since even though healing except for a small defect has taken place, how may one know that that defect is not one of a potentially malignant nature? We therefore believe that the management of gastric ulcer resolves itself only into the question of whether or not a gastric lesion can be closed medically, and, if not, whether or not the patient can stand partial gastrectomy, conservative surgical procedures being undertaken only upon obviously poor risk patients.

With reference to duodenal ulcer, we are in quite a different position, and here we find today considerable disagreement. On the one hand, we have the continental surgeons and a few also in this country who advocate partial gastrectomy for duodenal ulcer in general, and on the other those of more conservative disposition, who advocate lesser operative procedures for this lesion, such as pyloroplasty or partial gastrectomy. Around this discussion of partial gastrectomy versus gastroenterostomy or pyloroplasty revolves an apparently endless discussion and argument, based largely upon how frequently gastrojejunal ulcer occurs after gastroenterostomy, and what percentage of cures is obtained after partial gastrectomy as opposed to gastroenterostomy, with additional discussions as to the mortality rate after these radical and non-radical operative procedures.

A statement of our experience, no matter how small, will be of value in placing on record, at least so far, our percentages regarding these debated points. Of a series of 78 gastroenterostomies for duodenal ulcer performed and followed in this Clinic, we have had a demonstrated incidence of gastrojejunal ulcer of 4.9 per cent. Of this series, the operative mortality has been 5.1 per cent. Of a series of 22 duodenal ulcers submitted to resection, the mortality has been 13.7 per cent. We have had under treatment in the Clinic 35 gastrojejunal ulcers, 14 of which have been operated, with 3 deaths, a mortality just under 20%. (Chart I.)

DUODENAL AND PYLORIC ULCER

	1913-23	1924-30	Total
Resections	17	5	22
Died in Hospital	1	2	3
Mortality	5.9%	40%	13.7%

DUODENAL AND PYLORIC ULCERS

	1913-23	1924-30	Total
Gastroenterostomy	48	30	78
Died in Hospital	2	2	4
Mortality	4.1%	6.6%	5.1%

CHART I

The relatively small numbers of operations in this series is due to the fact that but ten per cent of the patients with ulcer in the Clinic have been operated upon. It is probable that this operative percentage has been too conservative. It is being quite definitely increased, however, now that we have had such an extensive experience with and opportunity to observe the course of these lesions.

There are certain necessary fundamental facts in connection with this discussion, and in dealing with a good many gastric and duodenal ulcers, we have had to try and evaluate them. One of the first ones is that partial gastrectomy, when applied universally for duodenal ulcer, while doubtless giving a better average of good end results, will show a mortality rate which is not justifiable as compared to the seriousness of the lesion. Gastroenterostomy will show a definite percentage of gastrojejunal ulcer recurrence averaging perhaps around six per cent., but dependent in a large measure upon how well patients adhere to a postoperative plan of dietary and life habit management.

The percentage of cures after gastroenterostomy will probably be considerably less than after partial gastrectomy, but this also will be related considerably to how much the patient modifies his dietary and life habits after gastroenterostomy.

We have repeatedly written and stated, and with added experience are more than ever convinced of its wisdom, that there is but one operation for non-healable gastric ulcer in the able-bodied patient; that is, partial gastrectomy, but that there is no single operative procedure which can be universally applied to those duodenal ulcers which have failed to respond to medical management.

Our attitude toward the surgery of duodenal ulcer is as follows: We believe that decision as to the type of operation to be employed in a duodenal ulcer patient coming to surgery should be deferred until the abdomen is open and the ulcer exposed, and then based upon the type and location of the lesion, together with a review of the patient's general condition and his or her ability to withstand the desirable procedure, an operation selected and graded to suit his or her lesion and resistance. When patients are able to stand it, it is desirable to employ partial gastrectomy in those eroding ulcers which have bled, in spite of non-operative management, since it removes the lesion and with it the danger of recurrent hemorrhage from it. It is desirable to employ partial gastrectomy in those eroding posterior wall ulcers which have extended into the pancreas, and are intractable to medical management, since they are the lesions least liable to heal and the most unmanageable medically. In both of these conditions, it occasionally becomes impossible to resect because of the patient's condition, and in such a situation we have found valuable the employment of the Devine procedure (Ill. IV), whereby the stomach is severed proximal to the pylorus, the duodenal lesion left undisturbed,

but the side of the jejunum anastomosed through the posterior leaf of the transverse mesocolon to the upper cut end of the stomach, leaving thus the duodenal lesion shut off from

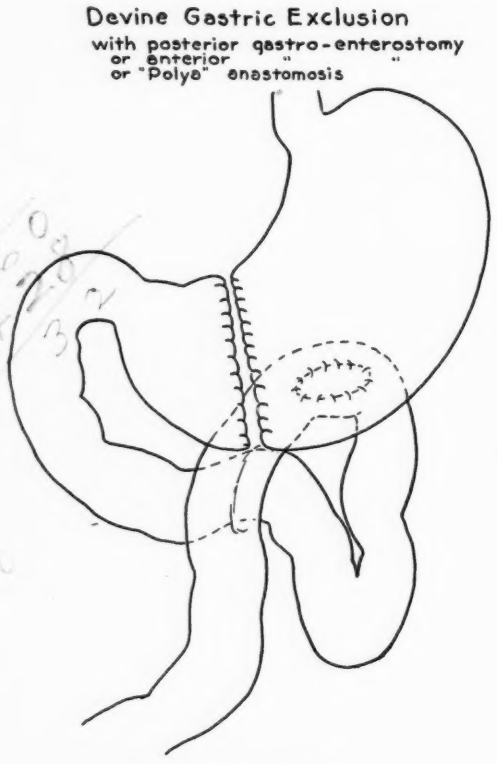


ILLUSTRATION IV.

This diagram illustrates the principle of Devine's gastric exclusion and has been of value in our hands in a few extremely bad risk patients with large recurrent eroding ulcers at or near the pylorus, in whom removal of the ulcer, had it been possible, would have been desirable, but because of their condition was impossible.

An example of one of the cases in which this operation was applied well illustrates its value. . . . original lesion duodenal ulcer, operation gastroenterostomy. Operation 9½ years later for gastrojejunal ulcer, excision of the stoma, removal of the gastrojejunal ulcer, resection of the jejunum and end to end anastomosis. Recurrence of ulcer symptoms in six months. Failure under medical management, intractable pain; re-operation showing large indurated ulcer at pylorus. Patient too ill to withstand resection. Jejunostomy done. Removal of jejunostomy tube at end of two months, followed by jejunal fistula with tremendous loss of weight, marked emaciation and digestion of wound edges. Fistula closed by suction and the double button method of closure. Return of intractable pain three weeks later. Devine exclusion operation performed with difficulty because of adhesions and distortion of stomach from previous operations, but patient greatly relieved of symptoms. End result far from a success, but patient has now succeeded in living in reasonable comfort for 25 months in spite of another hemorrhage.

direct emptying of the acid gastric contents into it, and a large opening into the remaining segment of stomach for neutralization of the remaining gastric contents.

Of the lesser operative procedures, pyloroplasty or gastroenterostomy, we distinctly prefer pyloroplasty with removal of part of the pyloric sphincter. This procedure does away with pylorospasm and permits alkaline contents of the duodenum to pass back into the stomach while gastric contents are still discharged into their natural receptacle, the duodenum. Unfortunately, pyloroplasty does not lend itself to those cases with pyloric and duodenal ulcer in which the duodenum and pylorus are distorted and contracted by scar tissue.

Gastroenterostomy, while the least desirable from a physiological point of view of all the gastric operations, because it discharges highly acid gastric contents into the jejunum, an intestinal segment not intended to receive them, nevertheless is so universally applicable to all duodenal ulcers and so helpful in relieving a definite number that its usefulness must be admitted and its employment frequently practiced. It frequently becomes the only justifiable operative procedure which can be advised.

Any patient who has had a duodenal ulcer, has had a gastro-enterostomy, and for a period of time has been relieved of his or her symptoms only to have them recur with added intensity, must seriously be suspected of having a gastrojejunal ulcer. If the patient has, in addition, tenderness over the gastroenterostomy stoma on fluoroscopic examination, together with high gastric acidity, plus the x-ray evidence of gastrojejunal ulcer, such as rapid emptying, rigidity, and irregularity of outline of the gastroenterostomy stoma, and occasionally a fleck of bismuth at the stoma, then the diagnosis of gastrojejunal ulcer becomes quite certain.

Of the 35 gastrojejunal ulcers coming to the Clinic for treatment, 21 have not been operated upon, and so the diagnosis not absolutely confirmed. These 21 have been successfully treated with medical management.

Of the 14 operated upon, 4 have had partial gastrectomy and the remainder have had a conservative operation consisting of resection of the jejunum and that portion of the stomach including the ulcer and the gastroenterostomy stoma with restoration of the digestive stream to its original course.

We feel very strongly, from our experience with these extremely dangerous and troublesome lesions, that the position taken by those in favor of radical gastric operations, that all recurrent ulcers should be subjected to resection, is not justifiable in our hands. We prefer and practice now in a majority of the patients with gastrojejunal ulcers the conservative procedure stated above, and endeavor by education to rid the patient of his ulcer-producing habits, to impress upon him his tendency to ulcer development and the risks of further operative procedures (partial gastrectomy) if intractable ulcer again recurs. This in our hands is more logical than at once advising such a

high risk (20 per cent. and over) operative procedure in all recurrent ulcers. (Ill. V.)

CONCLUSIONS

This discussion presents the views of a group of gastroenterologists and surgeons working together on this problem, the plan which we have employed in the management of those cases, and the positions we have assumed toward debated attitudes and operative procedures.

As to end results, we submit figures now for the first time at the end of five years. Further figures, in greater detail, are ready and will be submitted by Dr. E. D. Kiefer at the coming meeting of the American Gastroenterological Society next week.

But 10 per cent. of all the ulcers coming to the Clinic have been submitted to surgery in the last seven years, and so the figures available for surgical results are not large. Because of our attempt to select cases which will probably later need surgery, there is a distinct tendency in the Clinic, I believe, to increase somewhat the percentage of patients submitted to surgery, and later a greater number of surgical results may become available.

End results in the operative or non-operative methods of treatment of gastric and duodenal ulcer are extremely difficult to evaluate, since any digestive disturbance occurring after medical or surgical treatment has been counted as against the end result. In considering end results in gastric and duodenal ulcer, one must realize that a function such as digestion, so essential to life, so constantly in use, so habitually subjected to abuse, often unnecessarily by taste and necessarily by unavoidable need, so prone to react unfavorably not only to local lesions but to distant influences, becomes a poor indicator of the value of any method of treatment, but we have no other. With these limitations in mind, what we must attempt to accomplish is relief of symptoms, in the greatest number of patients, without surgery, and by study of our cases and statistics, the earliest possible detection of the patients who, under non-operative management, are not going to do well, in order that their time and money may not be wasted, and they may be submitted to surgery as early as possible.

MEDICAL TREATMENT

	Duration of Follow Up				
	One Year	Two Years	Three Years	Four Years	Five Years
Successful cases	355 (91%)	211 (81%)	121 (70%)	51 (61%)	20 (54%)
Unsuccessful cases	37 (9%)	49 (19%)	51 (30%)	33 (39%)	17 (46%)
Totals	392	260	172	84	37

SURGICAL TREATMENT

Successful cases	40 (70%)	31 (66%)	26 (62%)	21 (57%)	16 (52%)
Unsuccessful cases	17 (30%)	16 (34%)	16 (38%)	16 (43%)	15 (48%)
Totals	57	47	42	37	31

CHART II

We have refrained from publishing any follow-up figures on ulcer patients until they were available for a five-year period, and these represent our first follow-up report. This chart, to be justly interpreted, requires certain explanations. It should be appreciated that either in the surgical or in the medical group, if a patient gave any history of indigestion whatever in his follow-up record, he was recorded as an unsuccessful case,—a most exacting standard. It should be appreciated that the end result failure figures under surgical treatment are distinctly made larger because they include the surgical mortality. Under surgical mortality and surgical treatment of failures it must be recalled that in this group are all the bad risks rejected from the medical treatment group. In this group are the patients with kidney lesions who could not take alkalies for medical management. In this group are the patients with the intractable recurrent type of ulcer often unmanageable either from a medical or surgical point of view. In this group are the patients who are unmanageable as to dietary and living habits and who have been rejected from medical management for these reasons. In any series treated under such a plan as we have practiced and outlined in this paper, it must be realized that those patients who come to surgery are the worst risks both as to life and prospect of cure of their ulcer.

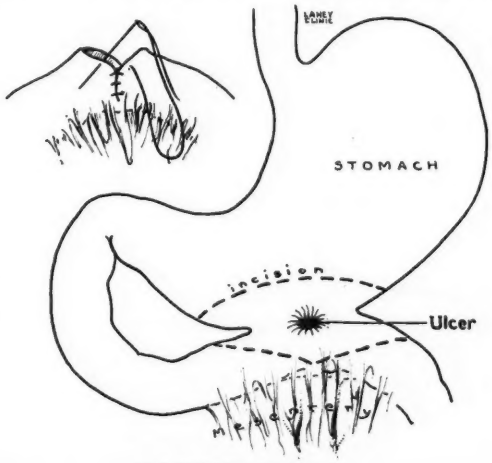


ILLUSTRATION V.

This diagrammatic illustration demonstrates by the dotted lines the area to be excised, including the stoma and the marginal ulcer. The sewing machine of De Petz has proven of great value in closing the posterior wall of the stomach and in preventing spilling of gastric contents into the lesser peritoneal cavity.

Note the desirability of doing partial resection only of the jejunum and, in the insert in the left upper corner, how easily the jejunum may be closed with partial resection due to the preservation of the mesenteric third of the lumen.

THE TONUS OF THE AUTONOMIC NERVOUS SYSTEM IN ARTERIAL HYPERTENSION*

BY ARTHUR PATEK, M.D.,† AND SOMA WEISS, M.D.†

THE ultimate causes of hypertension are obscure at present. Numerous theories have been proposed to explain the mechanisms responsible for the abnormal elevation in arterial pressure, the most generally accepted of which is that a barrage of the vasomotor system by sympathetic nerve impulses causes a spasm which narrows the arteriolar lumen. This state of hypertonicity caused by the incessant barrage of impulses results in an increased peripheral resistance to blood flow. (Weiss and Ellis[1].) The theory is supported by the observations that hypertensive patients tend to be excitable, hyperactive individuals, who feel too keenly and react in extremes; and also tend to benefit by relief from anxiety and the establishment of a placid régime of living. Riseman and Weiss[2] have found that almost all the symptoms of patients with arterial hypertension are referable to a disturbance of the central nervous system and are expressions of a disordered vasomotor system. It is the purpose of this study to define more exactly the nature of certain bodily functions in patients with arterial hypertension.

No objective evaluations of sympathetic activity in patients with arterial hypertension or comparisons of activity in different patients were made in the past. Such studies of the autonomic nervous system are exceedingly difficult and not sufficiently satisfactory. Many "tests" and "indexes" of sympathetic tone have been recommended, held in transitory vogue, and then disregarded. The large number and diversity of these tests, and the brevity of their recognition, demonstrate the difficulty of the problem and the futility of attempting measurements of a complex nervous system by single local signs of its activity. The unfairness of estimating the tonus of the entire autonomic nervous system by one sign is further substantiated by a consideration of its widespread anatomical distribution and physiological function. The autonomic nervous system affects the cardiovascular, gastro-intestinal, heat regulatory, secretory functions and probably many others. The sympathetic and parasympathetic (or bulbosacral autonomic) systems act antagonistically, and considerable change in their relative balance may occur both in the normal and the diseased body. Eppinger and Hess[3] first described syndromes of vagotonia and sympathicotonia and since then the concept of an abnormal balance within the autonomic nervous system has become widespread[4]. These syndromes are rarely generalized but occur in certain parts of the autonomic nervous system. Estimation of the tonus of the entire system is further complicated by the fact that the sympathetic system apparently may be dominant in one aspect of its functions yet passive in others.

In this study, then, the history and psyche of the hypertensive patient were analyzed and certain reflexes in the eyes, heart, skin and blood vessels observed in the hope that a fairly reliable estimate of the tone of the sympathetic nervous system, particularly of its vascular aspect, might be obtained. Forty-two patients with arterial hypertension and 37 control subjects were studied systematically. The patients with hypertension exhibited clinically no involvement of the cardiac, renal and cerebral functions. Arteriosclerosis of the blood vessels was absent, so far as one can estimate this clinically. The control cases were patients from the hospital ward with similar age distribution and with normal cardiovascular systems. The particular aspects of the history and bodily functions studied are described below. The word hypertonia is used for increased sympathetic tone (sympathicotonia), hypotonia for increased parasympathetic tone (vagotonia) throughout the discussion.

METHODS OF OBSERVATION

(a) In the *history* of the patient, thermal instability, palpitation, tachycardia, diarrhoea without recognized cause, and sweating* were considered as signs of hypertonia; chilblains, eczema, asthma, urticaria and spasmodic constipation, as signs of hypotonia.

(b) The *personality* of the patient was observed for excitability, over-activity, impulsiveness, worry and phobia, which are generally accepted as indications of hypertonia; while calmness, indolence, deliberation, and serenity were considered as signs of hypotonia.

(c) In the *eyes*, a brisk reaction to light, large pupils, infrequent winking, and exophthalmos were considered signs of hypertonia due to cervical sympathetic over-activity. Small pupils, sluggish reactions, hippus, frequent winking, and enophthalmos, on the contrary, were regarded as expressions of hypotonic over-activity. The size of the pupils was measured in a number of instances, but these measurements were abandoned later because they were too vague and varied too much with the surrounding conditions.

*From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard) of the Boston City Hospital and the Department of Medicine, Harvard Medical School, Boston, Massachusetts.

†Weiss—Assistant Professor of Medicine, Harvard Medical School. For records and addresses of Patek and Weiss see "This Week's Issue", page 359.

*Langley(15) explains the discrepancy between the parasympathetic action of pilocarpin (as used by Eppinger and Hess) and the true physiologic, sympathetic innervation of the sweat glands.

(d) The *extremities* were examined for temperature, moisture and color.

(e) *Sinus arrhythmia* is a normal physiological condition in youth; but in adults, such as were observed in this study, it is accepted as a sign of vagus activity of hypotonia.

(f) The *pilomotor muscles* are controlled by the sympathetic nervous system and uniquely possess no inhibitory or antagonistic fibres[5]. They respond to local or reflex excitation and to pharmacodynamic agents. An exaggerated pilomotor reflex, therefore, indicates hypertonia. Cold, brushing, pinching and electricity elicit a response. Thomas[6] brushes the subaxillary region lightly, to provoke a homolateral downward progressing wave and pinches the nape of the neck to produce bilateral effects. Great difficulty was encountered in evaluating this test quantitatively.

(g) T. Lewis[7] and A. Krogh[8] have made, within the last decade, careful, intensive studies of *dermographic responses*. They found that drawing an instrument lightly across the skin produces a transitory blanching probably due to a displacement and obliteration of the vessel walls. In about 15 seconds this white line becomes visible again along the path of the stroke. According to Lewis this secondary phenomenon is due to a constriction of the walls of the minute capillaries and venules responsible for skin color, in response to tension.

If the pressure is increased, a red reaction replaces the white. This, in turn, is explained as an active relaxation of the same vessels in response to greater pressure. This is due to "active dilatation of the terminal arterioles, capillaries, and minute vessels". On still greater pressure, a white border or "halo" appears along the red line, the mechanism being the same as that of the white reaction first described. After a painful mechanical stimulation of the skin a reflex erythema or "flare", due to stimulation of the pain sensory nerve endings, occurs. This appears at some distance from the line of excitation, supposedly through an axon reflex (Krogh) which involves the arterioles, capillaries and venules in an active relaxation.

The dermographic reactions described are local and mechanical according to the interpretation presented; nevertheless it is known that these minute vessels, particularly the arterioles, have a rich sympathetic nerve supply, that their tonus is maintained by this system, and that they are susceptible to "central effects". Emotional paleness, blushing, and such psychic vascular reactions depend respectively upon the activity and relaxation of the sympathetic tonus. Assuming, therefore, that the dermographic responses are influenced by the sympathetic system, we devised an instrument for the quantitative measurement of these reactions. This instrument, by which the same pressure and stroke might be applied, with the aid of a calibrated metal spring, to each subject, is shown in the accompanying diagram. (Fig. 1.) The skin was stroked along the second costal interspace, the upper arm and at the level of the umbilicus on the abdomen at pressures of 150 grams and 300 grams respectively and at a speed of 10 cm. in two seconds. The type and duration of response were observed. A pink or red line was recorded as a "red reaction"; a red line with white borders was called "red with white"; a sharp reaction followed by the alternate color was labelled "red into white" or "red with white into red" or "into white" as the case might be.

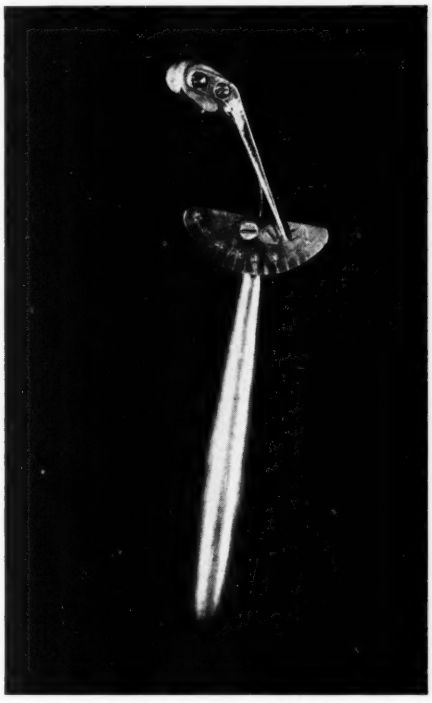


FIGURE 1. The instrument "permographometer" used for the quantitative evaluation of the dermographic responses.

(h) The *oculo-cardiac reflex*[9] is a vagus reflex. A slowing of 12 or more beats per minute was therefore considered a sign of hypotonia; a failure to respond, or a contrary acceleration of pulse to pressure, as a sign of hypertonia. Two trials were made on each subject and the pulse recorded before, during and directly after the pressure.

(i) Barbier[10] describes the *tension reflex of the artery wall* to compression as a measure of arterial tone. Repeated sharp drops of the systolic blood pressure after initial rises on successive applications of the cuff indicate dystonia or instability of the arterial tonus. No initial rise and an even tension signify a hypotonic condition; a sustained rise before the return to a lower level implies spasm or hypertonicity.

(j) *Auscultatory changes over the artery*[10, 11] give a further indication of the sympathetic tone. In normal individuals the third tone, a

metallic, sharp click, becomes muffled on successive compressions. This phase is feeble or absent in hypotonia and fades out quickly as the compressions are repeated. In hypertonia, the third sound remains fixed and its tones are clear and metallic. The readings for six cuffings and notes on the changes in the tone quality of the third phase were recorded on each patient examined.

(k) The *pigmentation of the skin* is said[12] to be influenced by the sympathetic nervous system. Some evidence is available that the protective coloring of animals is governed by the sympathetic system; some even claim that the pigmentation of Addison's disease is a solar plexus effect, although this is generally denied. As a matter of interest, in view of these theories, freckle-like pigmentations, red spots, and hair color were noted in examining the patients.

(l) *Drug tests* were not used as the literature on this subject[13, 14], particularly in respect to epinephrin and atropin is contradictory and confused. Our experience has failed to substantiate the value of these tests. The methods of administration are various and the resulting symptoms are too disagreeable in proportion to the information they offer to make the experiments worth while.

The results of the study of the symptoms and signs of sympathetic nervous activity just described are summarized in the tables which follow:

	Patients with Hypertension		Control Subjects	
	Number	Per Cent.	Number	Per Cent.
History:				
Chilblains	17	36	11	30
Asthma	6	12	6	16
Spasmodic constipation	9	19	0	0
Diarrhoea without cause	1	2	3	8
Palpitation	30	65	17	46
Sweating increased	23	49	7	20
Hot flushes	28	56	14	38
Psyche:				
Excitable	31	67	20	54
Calm	15	33	17	46
Hyperactive	38	75	24	65
Impulsive	25	53	13	37
Deliberate	14	30	20	55
Excessive worry	39	83	20	54
Excessive fears	7	16	6	17
Eye signs:				
Hippus present	10	26	16	51
Hippus absent	28	74	15	49
Extremities:				
Hot	7	13	3	9
Cold	24	46	8	21
Normal heat	21	41	26	70
Moist	18	37	14	39
Dry	7	14	3	9
Normal moisture	24	49	19	52
Sinus Arrhythmia:				
Present	2	5	17	46
Absent	37	95	20	54
Pigmentation:				
Red spots present	71	88	10	33
Red spots absent	10	12	22	66
Freckles present	33	77	16	53
Freckles absent	10	23	14	47

DERMOGRAPHIC RESPONSES

Reactions	Patients with Hypertension Number	Per cent.
CHEST		
150 grams pressure		
Red	5	
Red with white	2	Red 18
White	7	
Transient white	13	White 82
Red into white	12	
Average time 1.6 min.		
300 grams pressure		
Red	3	
Red with white	8	Red 30
White	5	
Red into white	15	White 55
Red with white into white	5	15
Average time 3.1 min.		
ARM		
150 grams pressure		
Red	5	
Red with white	1	Red 16
White	19	
Transient white	13	White 84
Red into white	1	
Average time 1.5 min.		
300 grams pressure		
Red	4	
Red with white	4	Red 21
White	15	
Transient white	1	
Red into white	12	White 77
Red with white into white	1	2
Average time 2.6 min.		

Reactions	Control Subjects Number	Per cent.
CHEST		
150 grams pressure		
Red	13	
Red with white	1	Red 43
White	10	
Transient white	1	White 57
Red into white	8	
Average time 2.0 min.		
300 grams pressure		
Red	8	
Red with white	17	Red 84
Red with white into white	1	
Red with white into red	1	White 16
White	1	
Red into white	4	
Average time 7.1 min.		
ARM		
150 grams pressure		
Red	5	
White	20	Red 15
Transient white	5	White 85
Red into white	3	
Average time 1.5 min.		
300 grams pressure		
Red	8	
Red with white	12	Red 66
Red with white into white	1	White 34
White	9	
Red into white	2	
Average time 4.4 min.		

ABDOMEN

150 grams pressure

Red	5	
Red with white	1	Red 18
White	15	
Transient white	13	White 82

Average time 1.1 min.

300 grams pressure

Red	2	
Red with white	12	Red 41
White	11	
Transient white	4	White 59
Red into white	5	

Average time 1.7 min.

ABDOMEN

150 grams pressure

Red	1	
Red with white	1	Red 7
Transient white	11	White 93
White	19	

Average time 1.6 min.

300 grams pressure

Red	5	
Red with white	12	Red 62
Red with white into white	1	White 38
White	10	
Red into white	1	

Average time 4.0 min.

DISCUSSION

Of the group of symptoms elicited by study of the history of the patient none were established as reliable indications of sympathetic tone. The few instances of chilblains, asthma and spasmodic constipation reported were unexpectedly more prevalent among the hypertensive group than among the controls. Palpitation was as often a complaint of the controls as of the hypertensive patients. The increased sweating and hot flushes frequently reported by the hypertensive patients were so often associated with the climacteric as to make their specific significance questionable.

Although the subjective evaluation of symptoms by the patients was inconclusive, nevertheless, there was a tendency for the group with hypertension to report excitability, over-activity and impulsiveness while the controls appeared on the whole relatively more deliberate and serene. The outstanding difference between the two groups was in their relative propensities to worry. The worries of the hypertensive patients were more intense than those of the control group and seemed petty and consuming. The same source of worry produced more intense psychic response in the patients with arterial hypertension.

Of the various eye signs generally believed to be important in detecting hypertonia, the hippus reaction alone showed appreciable deviation, being decreased in hypertensive patients and present or absent in about equal numbers of controls.

In a majority of the control cases the extremities were normal, whereas hot or more often cold hands and feet were complained of by the hypertensive patients. There were no differences in color or moisture between the two groups.

A striking distinction between the two groups appeared in the absence of *sinus arrhythmia* in 95 per cent. of the hypertensive patients, while it was present and absent in equal numbers of the control cases. As both the hypertensive and control subjects were in the advanced adult age group, this difference cannot be attributed to the physiologic arrhythmia of youth.

Many of the hypertensive patients had observed pigmentary changes with the onset of their symptoms in the appearance or increase of brown spots, freckles and red spots. A search for these showed that freckles or brown spots were present in 77 per cent. of the hypertensive patients and in 53 per cent. of the control cases. These spots were generally found on the upper trunk, forearms and face. Cherry red spots were present in 88 per cent. of the hypertensive patients and 33 per cent. of the controls. They varied from spots of pinhead size, not palpable and fairly easily pressed out; to raised blebs of one-half centimeter in diameter. They appeared chiefly in the upper trunk, upper arm or abdomen. In one instance they were seen on the head, but were never seen on the legs. The noticeable fading of the younger red spots suggests their telangiectatic origin and the vascular instability characteristic of the hypertensive group.

Stroking with the "dermographometer" showed a marked tendency of the hypertensive group to react with a white line to both degrees of pressure in all sections of the skin that were tested. From this it would appear that the red action represents a vasodilatation; the white, a vasoconstriction. The following facts are brought out by these reactions:

I. *Duration of Reaction.*

a) Skin reactions are of the longest duration in the upper trunk; (b) the duration of the reaction varies directly with the pressure exerted; (c) the duration of the reaction in hypertensive patients is less than in the controls.

II. *Type of Reaction.*

The type of reaction varies with the pressure exerted.

a) *Controls*

The reactions are predominantly white with light pressure (150 gms).

The reactions are predominantly red with heavy pressure (300 gms).

b) *Hypertensives*

The reactions are predominantly white with light pressure (150 gms).

The reactions are predominantly white with heavy pressure (300 gms).

The predominant white reactions of the patients with hypertension to both light and heavy pressures indicate hypertonicity and the shorter duration of the reaction in these patients suggests hyperirritability of the vessels.

The differences which were found in response to the oculocardiac reflex were definite. The pulse of the control patients was retarded during pressure but quickly recovered its initial level on release of the pressure. The pulse of the hypertensive patients, on the contrary, responded little during compression but showed a definite acceleration when the pressure was released. The hypertensive patients showed, perhaps, less stability of the arterial pressure during successive cuffings with the sphygmomanometer, but on the whole the difference between the arterial reflexes of the two groups was negligible. The third auscultatory phase, however, was strikingly characteristic. The clear, brittle third phase tone, which appears with hypertonicity or spasm, was present in 82 per cent. of the patients with hypertension while it was heard in only 12 per cent. of the control cases. In fact, this difference was so remarkable as to suggest that with practice the examiner can use this brittle tone diagnostically.

CONCLUSIONS

1. The psychic state and the tonus of the autonomic nervous system of 42 patients with "essential" hypertension were compared with that of 37 control patients with a normal cardiovascular system. While no one symptom or sign used for the evaluation of the autonomic nervous system was absolute or pathognomonic, the following symptoms and signs, in combination, distinctively were more frequently present in patients with essential hypertension than in control subjects: (1) overexcitability, impulsiveness, a tendency to worry; (2) a negative hippus; (3) absence of sinus arrhythmia; (4) negative or reverse oculocardiac reflex; (5) a persistent brittle third tone throughout six sphygmomanometer cuffings; (6) "white" dermographic reaction both to light and heavy pressure; (7) tendency to telangiectasis.

2. As judged from tests performed, the minute vessels of the skin in arterial hypertension are hyperirritable and have a tendency to react with pressor rather than with depressor responses.

3. A striking difference in the tonus of the autonomic nervous system in arterial hypertension as compared with that of controls does not exist. On the whole, however, the influence of the parasympathetic nervous system is less and of the sympathetic nervous system more pronounced in patients with arterial hypertension than in control subjects with a normal cardiovascular system.

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MODERN NURSING*

BY ALFRED WORCESTER, M.D.†

SOME knowledge of the history of the profession one is entering ought to be considered indispensable. Only so can there be any surety of retaining the high ideals of that profession as exemplified in the lives of its former leaders. If this is true for the older professions it is doubly true for the young profession of nursing. Young clergymen and doctors and lawyers are proud of their great predecessors, whose portraits and statues adorn their schools, while their well-known life-stories afford continuous inspiration. But for those just entering the profession of nursing there is as yet available only scant material for such inspiration. Even of Florence Nightingale, until Sir Edward Cook's two large volumes appeared, we have had only wishy-washy biographies which unfortunately have had a vastly larger circulation. Of her great followers we have only most meagre life-stories.

It therefore seems to me obligatory upon such occasions as this that those of us who have known the great leaders of modern nursing should tell you all that we can about them.

In these days it is often said that we can learn more easily from what we see than from what we hear. That means that what goes into one ear can only too easily go out of the other, while what goes in through the eyes is more likely to make an indelible impression on the

*An Address at the Graduation of Nurses, St. Luke's Hospital, New Bedford, Mass. May 15, 1931.

†Worcester—Professor of Hygiene, Harvard University. For record and address of author see "This Week's Issue", page 359.

memory. If this be so, instead of telling you about the development of modern nursing, I wish that I might throw upon the screen a series of pictures from my own memory. Not being able to do that, I can only try to describe them for you.

My first picture is of a lovely Southerner, Doctor Susan Dimock, who was trying to persuade my mother to let an older sister of mine enter the nursing school about to be established at the New England Hospital for Women and Children. At that time, now just sixty years ago, there was not a single trained nurse, nor even a pupil nurse in this country, and, as my mother insisted, nursing was then believed to be a suitable occupation only for widows and old maids. Vainly did Doctor Dimock tell of the Nightingale School which she was hoping to reproduce in Boston, and I have never forgotten either her disappointment or my sister's.

My next picture is dated a few years later when Linda Richards, the first nurse ever graduated in America, was starting the Massachusetts General Hospital training school. In those years college boys who were intending to enter the medical school used to visit the Hospital on public operating days. When rumors reached us of the lovely young nurses in blue-striped uniforms, who were replacing the far less attractive old-timers, we of course hurried in to verify the rumor. Nor were we disappointed. I only wish I now could share with you my memory picture of them. But I am afraid you would laugh at the queer way those girls wore their lace caps—on the top instead of on the back of their heads. A clearer picture of their young superintendent is dated a few years later when she sat at the head of the house-doctors' table at the Boston City Hospital. I wish I could put into words my memory of Linda Richards's wonderful combination of cordiality and dignity, of firmness and kindness, of professional zeal and tender devotion. If we are ever so fortunate as to have a real history of American nursing, her character and achievements will fill many pages.

But we must go back to the old world for the history of modern nursing. Let me then picture for you its birthplace at Kaiserswerth on the lower Rhine. On the river bank are the ruins of the castle where Frederic Barbarossa lived a thousand years ago. Not far from these ruins you still can see the tiny garden-house where Fliedner's School for deaconess nurses began, now nearly a century ago. In the larger building opposite you can see Florence Nightingale's room when she was a pupil nurse, and there, too, is the flagstone corridor which she scrubbed on hands and knees, after Fliedner told her she would not be willing to do such humble service. "And it was then a very dirty floor", as she afterwards told me. But you must see more of Kaiserswerth if you are to share my memory pictures. Of the first three graduates none were living when I first went there, now nearly forty years ago. But of the second class there was one. Sitting under a blossoming apple tree this dear old woman was counting the linen fresh from the laundry. Behind her was a young probationer keeping tabs who, in answer to our question, said "Oh no, she can no longer count accurately, but she doesn't know it and she just loves to be useful." I remember wondering then if our nurses when incapacitated by age would be so kindly cared for—just as now I am wondering how we can provide for our veteran nurses anything like the comforts of the German Feier-Abend homes. I must picture one of them for you. As it adjoins the chapel those nearing this life's end can hear the organ and the grand old chorals. In their quiet shaded rooms are flowers and bird songsters. But most important of all there are pupil-nurses on duty there, caring tenderly for the aged, such as are never even seen in our hospital wards. You must also look in at the créche where babies are being tended by probationers, who thus are learning that nursing essentially is mothering and that the helplessness of sickness is exactly like that of infancy and of old age, where we all have to depend upon motherly care. If you look closely at these young deaconess nurses you will see that in this service their hearts, as well as their heads and hands, are in full employ, as is not always possible in the wards and operating rooms of the hospital.

After this glimpse of the cradle of modern nursing you will want to see the woman who brought back to England what she had learned in Kaiserswerth. But on our way to London we must visit the Hospital of the Beguines in the old city of Bruges where Florence Nightingale served under these Roman Catholic sisters. I wish I could make you see them; but how you would laugh at their bright red and blue woolen skirts and their flowing headgear! And yet if you could hear as I have heard the gratitude of their patients you would realize how little exquisite nursing depends upon the fashions of either uniforms or environment.

And now comes the memory picture which I most want to share with you. Our cab will leave us at a modest London door which will be opened for us by a young nurse who will at once take us up the broad old-fashioned stairway, for, as you may be sure, we have kept our appointment to the minute. The upstairs drawing room is large and airy. And there half reclining on her couch by the windows is Florence Nightingale. Although in light that is shaded by the garden trees you will at once notice her loveliness, her soft white hair, her exquisite complexion that needs no rouge for beauty's heightening. After her cordial greeting, in a chair beside her you will hear such a melodious voice as you never heard before asking first about what you have seen in Kaiserswerth and Bruges, and then of her old friends, Linda Richards and Susan Dimock, and then about our American training schools which as you will find, she does not fully approve. She fears that too much attention nowadays is

being paid to the science and too little to the art of nursing. Her questions come so fast you will have scant chance for yours and some of those you ask she will smilingly evade. When the tea tray is brought in and your cup has been filled just as you want it, if you do not stop to drink it her first comment will be, "Your tea is growing cold," and if you further delay she will say, "evidently I have failed to make the tea to your liking." Then you will have to drink it and she will urge you to have more. When you begin to go, and even a second time when, fearful of outstaying, you rise to take leave she will insist upon your staying until she has given her definite advice about schools of nursing, and you must still further wait for her to pray "for God's blessing upon our work".

Returning now to our own country, and not noticing the lapse of a full quarter century, I want you to sit on the platform with me in the largest auditorium in Washington at the celebration of Florence Nightingale's hundredth birthday. As you see the thousands of nurses gathered there, all in the uniforms of their various schools, you will more than ever realize to what a mighty army you now belong. And, remembering the noble woman in whose honor the meeting is held, perhaps you will wonder if in this marvelous growth of modern nursing there has been maintained the sanctifying spirit of its founders. The same question may recur if you now in imagination will sit with me on the platform of the Old South Church in Boston, where just a year ago we were holding a memorial meeting for Linda Richards. I had seen her a few weeks earlier in the Hospital where, nearly sixty years before, she had received the first American nursing diploma. For several years she had been partially paralyzed and almost blind. But her memory was not dimmed, nor her affection for old time friends. She was patiently waiting for the final summons.

Not in her fading years, however, but as she was in her prime would I have you remember her, when Florence Nightingale said "We have as much to learn from her as has she from us."

HYGIENIC ADJUSTMENT THROUGHOUT LIFE

In a recent statement, the United States Public Health Service points out the very significant hygienic relationship that exists between the important changes which take place in the human body from birth to death, and the modification of one's habits and mode of life necessary to bring him into harmony with these changes, if he would maintain health and well-being. This, it would seem, might very properly be called an adjustment between bodily modification and mode of life. The word used is a matter of no great significance, so long as the underlying idea is understood.

It is, of course, a well-known fact that the human body undergoes profound changes as the years advance and that each individual human being is called upon during an average lifetime to adjust himself to these important changes which take place within his own body. Most of these changes occur gradually and slowly, and readjustments in our habits and customs of living can be readily made if one knows what is taking place and appreciates the necessity for such readjustments. Only one of these adjustments is radical and rapid, and that one occurs at the time of birth, when the human organism must immediately accommodate itself to sudden and profound changes of existence. After that, the other changes come gradually and slowly with the years.

While these changes are gradual, there are certain periods of life when they are recognized by all; and these various age periods, therefore, become significant in this connection. Such a division into age periods is largely arbitrary and somewhat indefinite. This makes no real difference, however, so long as we recognize that they do occur and that the changes in the body are more or less characteristic of the respective age periods.

It will be recalled that in Shakespeare's play "As You Like It", there are some well-known lines beginning with the familiar metaphor—"All the world's a stage", wherein the poet divides man's life into seven stages, from infancy to extreme old age. He speaks of the "mewling infant", the "whining schoolboy", the "lover sighing like a furnace", "the soldier jealous in honor seeking the bubble reputation", "the Justice with fair round belly", then the "lean and slipper'd pantaloon stage", and, finally, "second childishness".

These seven periods may serve as well as any others, although extreme old age, in this connection, might be omitted. To simplify this conception let us say that these age periods are infancy, childhood, adolescence, manhood, middle age, and old age. As we pass through these periods of existence many readjustments must take place to meet concomitant bodily changes. It is not necessary for the present purpose to point out definitely the changes corresponding to these various age periods; at this time it is the purpose rather to lay stress upon the fact that such changes do occur, that they are more or less characteristic of the respective periods, and that if we fail in our habits of life to conform to such changes, we shall not maintain bodily health and vigor.

Besides the bodily changes, we, of course, have mental changes as well, and our outlook on life will vary as we pass through these periods. It is a mistake, perhaps, to separate so sharply bodily and mental changes, because the body is a unit; but the mental changes are emphasized for the reason that they modify in a very significant way a person's attitude towards existence. To paraphrase a well-known biblical saying: "As a man thinketh in his heart, so will he live." Our thinking, then, and our general attitude towards life becomes, in this connection, important, and readjustments in the mental sphere are just as significant as they are in the physical sphere.

MEDICAL PROGRESS

THE PROGRESS OF NUTRITION

BY FRANCIS LOWELL BURNETT, M.D.*

I. THE NATURE OF NUTRITION

THE will in nature is expressed by various forces that influence the life of every plant and animal in a struggle for existence. Sometimes these forces favor the growth and development of a species; at other times retard them; yet at all times and little by little some change is taking place. Animals in a natural environment appreciate this inevitable progression and by instinct adapt themselves to new conditions. Perhaps a slight change in the form of habitation or a minor alteration in the kind of food is required. At one time primitive man lived in a natural environment and instinctively made a precise selection of food according to the needs of his body. By the action of such a dominant natural faculty, he may have been able to develop and maintain his body in an almost perfect state of integrity. With increasing intelligence he devised weapons for hunting and fishing, he learned to cultivate plants valuable for his sustenance; and thus his food supply became more varied and abundant. After the discovery of fire, he found that cooking made some foods more palatable. Through these changes he became more domesticated, he ate more by custom and habit, and his instinct for the selection of food became less precise. Still later he became more civilized and the inevitable progression brought about changes in his vital processes that he could not instinctively alter; and like other animals subject to the laws of nature, man became afflicted with the insidious processes and invidious enemies that are always attempting to bring about his destruction.

The unusual health of a tribe described by McCarrison (*J. A. M. A.* 78:1, Jan. 7, '22) suggests that some semicivilized people may still instinctively select food according to the requirements of their bodies and thus acquire and control an improved state of well-being. These unusually healthy people inhabit a remote part of the Himalaya Mountains, and live on the "unsophisticated foods of nature. They eat but twice a day also; and their food generally consists of eggs, milk, melted butter, wheat, Indian corn, barley, green vegetables and fruit. Sugar is a great luxury and only a little salt is consumed. Then as they make a ceremony of their meals, they do not bolt their food like many of the Western people." The results of such a meagre, properly prepared and proportioned food is that their bodies "are of magnificent physique, preserving until late in life the characteristics of youth; they are also unusually fertile and long lived, and endowed with nervous systems of notable stability. During the nine years of my association with these people, I never saw a case of asthenic dyspepsia, of gastric or duodenal ulcer, of appendicitis, mucous colitis, or of cancer; indeed their buoyant abdominal health has, since my return to the West, provided a remarkable contrast with the dyspeptic and colonic lamentations of our highly civilized communities." On the other hand, the nutrition and health of the Hausas and Town Fulani as observed by McCulloch (*West African M. J.* 3:36, Oct. '29) are very different from those of the Indians. These negroid peoples, inhabiting Northern Nigeria, consume food of another kind. The diet consists largely of cereal food, contains only a small amount of protein and fat, both of which are of poor quality. The results of such poorly proportioned food are that there is a high infantile mortality, lactation is not often successful, and children and adults are short and underweight.

II. FOOD, HEALTH, AND DEFICIENCY DISORDERS

The cure of disease is brought about by the restoration of health; therefore disease may be defined as readily in terms of health as health is in terms of disease. In other words, through an understanding of the means to determine an exact and improved state of health a vague and heretofore unrecognized morbid process may be revealed; and thus by the correction and subsequent control of this process in patients, some diseases now resistant to local treatment may not only be relieved but cured by the prevention of a recurrence. Such a process may be malnutrition, but of a kind that is much more complex and delicately adjusted than is generally thought of at present. For when one realizes that the final and most important deposition of nutrient substances in all living bodies is the cells of the tissues, it becomes evident that such a construction and maintenance must be exceedingly intricate, and in man seems to be influenced by many factors in his ways of eating and mode of living. Furthermore as such a process must be generally silent, and therefore without symptoms, the clue to its existence and the measures to adopt for its correction are difficult to ascertain and regulate.

In an article on some relations of the chemistry of nutrition to health Sherman (*Porto Rico J. Pub. Health and Trop. Med.* 5:407, June '30) has given an interesting discourse. Through the remarkable acumen of Dr. Babcock, a pioneer in agricultural science, an investigation was car-

*Burnett—Investigator of Nutrition and Skin Diseases, Massachusetts General Hospital. For record and address of author see "This Week's Issue", page 359.

ried out by which young cows were fed balanced rations from the corn, wheat and oat plants. The corn plant ration proved to be the best as the animals developed sleek, healthy, and vigorous bodies, but the wheat was the worst, as the animals showed a rough coat and became feeble and prematurely old. This was the first noteworthy experiment of the kind carried out in this country and stimulated research work in modern nutrition. Other portions of the article describe vitamin A in nutrition and health, its formation in nature, and its distribution among foods; vitamins B and G, calcium, iron and copper, and public health aspects of food supply problems. While the value of milk for the promotion of health has been especially emphasized in this paper Egdahl (*Mil. Surgeon* 67:441, Oct. '30) considers the lack of this food in the development of deficiency diseases and other disorders. Milk serves as a valuable source of the vitamins and the most important minerals. The proper selection of food for the maintenance of health is receiving more and more recognition. From this point of view Stewart (*J. Michigan Med. Soc.* 28:835, Dec. '29) writes in part if we study the factors which "are concerned in the maintenance of health and longevity of man we will find that nutrition is the most important of all. The principles underlying the selection of an adequate diet, both in health and disease, are comparatively simple and can be readily understood and applied. The average normal individual requires sufficient food to furnish him with a full value of about 2,600 calories daily, the proteins furnishing about 10, the fats 30, and the carbohydrates 60%. If the diet is of such a nature that the ash is dominantly acid and is not properly eliminated by the kidneys, the alkalinity of the blood will be gradually reduced . . . which sooner or later produces acidosis . . .". Ketonuria will come into existence with the consumption of too much fat and too little carbohydrate. An adequate amount of minerals in our food is necessary for a normal diet, and iron, phosphorus, calcium, carbonates, sodium and sulphur are the most important. Finally, foods containing the vitamins must be ingested to prevent deficiency diseases. In a somewhat similar article by Stone (*J. A. M. A.* 95:709, Sept. 6, '30) on dietary facts, fads, and fancies, the amount of sugar consumed by English speaking people is considered very excessive, but a substantial protein intake daily of one gram per kilogram of body weight is not believed to be injurious.

A note of a different tone has been sounded in the pursuit of health by Hutchison (*Canad. M. A. J.* 24:16, Jan. '31). He writes in part "the old ignorance about the body and stolid resignation to its ills, was probably a more 'healthy' attitude, and certainly a happier one, than the modern curiosity and over-anxiety. The over-anxiety may show itself in one of three ways: First, it may affect an individual as regards his own health. . . . The diet faddist is perhaps the commonest and most indignant of this type. Secondly, it may be exhibited by normal persons in regard to the health of those near and dear to them. . . . And thirdly, the over-anxiety may assume an epidemic form, involving whole communities or nations. . . . I know of only one health rule which is universally applicable 'He that striveth for mastery is temperate in all things! . . . Moderation in all things be it observed, in food and drink, in work and in exercise, in smoking and in sleeping—moderation even in being moderate, for an occasional departure from the strict rule of moderation is probably good for the health." Rubner (*Foreign Letters, J. A. M. A.* 95:677, Aug. 30, '30) condemns the attempts at rejuvenation by abstinence from food. He writes that during starvation not only the cellular protein but also the nuclei lose in substances; and when assimilation begins again with the consumption of food, the new protein is merely attached to the remnants of the old cells, and the new one has the same properties as the old protoplasm. A digression from the ordinary has been elaborated by the Regius Professor of Medicine at Oxford, Dr. Buzzard (*Brit. M. J.* 2:849, Nov. 22, '30) in an article on rest, work, and play, in health and disease. The author advocates a critical attitude in advising rest. Some patients if taken away from normal family and social ties, and placed in an environment in which they do not have a useful occupation, frequently become neurasthenic, and the disease is not benefited. The results of treating several patients suffering with epilepsy are described. In conclusion he writes "But if regulations are impossible, guiding principles are not without their value; and among these I would emphasize again: (a) The recognition of work as an ally, not an enemy, in the therapeutic operations on nervous disease. (b) The paramount importance of a correct diagnosis in functional disorders before determining the part to be played by rest and work in their treatment. (c) The value of physiological and psychological considerations in the choice of recreations."

The clinical aspects of deficiency diseases have been described by Minot (*Arch. Int. Med.* 3:216, Sept. '29), in an interesting article. The author concludes that deficiency disorders occur in many and varied types, some of which are recognized after many years; that they may be the result of a failure to assimilate the required factor; and that the lack of a vitamin not only causes a particular disease but also plays a rôle in the economy of the body, by its effects on certain functions and types of cells; and that the proper treatment requires a recognition of the relationship between the amount of the substance the patient receives and the beneficial results produced. Vitamins and hormones will

not cure all disorders, but final knowledge of deficiency diseases will be obtained by studying man with adequate controls. An illuminating and detailed discussion of the relation of food to the development and cure of beri-beri, pernicious anemia, and sprue has been given by Vedder (*Porto Rico J. Pub. Health and Trop. Med.* 5:456, June '30). He gives the opinion that "dry beri-beri is caused by the deficiency of anti-neuritic vitamin, and that wet beri-beri was oedema or prison dropsy; and the other diseases characterized by oedema and cardiac swelling were probably caused by long-continued protein deficiency combined with excessive liquid intake." In regard to pernicious anemia he writes "the anti-anemic vitamin is actually synthesized and secreted by the healthy stomach, and that this power is lost in pernicious anemia, and is not restored by a liver diet. It is possible that the liver . . . serves as a depot for the anti-anemic vitamin; . . . and the good results in pernicious anemia will be produced as long as the liver is administered, but relapses will occur after it is discontinued." He describes sprue as presenting many similarities to pernicious anemia, but being a different disease; for although sprue may be cured by a liver diet, it is probably not due to the same factor that cures the primary anemia.

III. OBESITY, FAT METABOLISM, AND DIABETES MELLITUS

The excessive increment of fat in the human body is undoubtedly due to malnutrition. Ordinarily, man is not a hibernating animal which goes many months without consuming food, and therefore has to accumulate a reserve to supply the small requirements of the body during the dormant period. Such an excessive increase of fat is necessary in the economy of hibernating animals; but in man the nutrient substances to build up this useless tissue must be taken in part from those required for the development and maintenance of the normal tissues. Furthermore, in considering that the normal healthy man is heavy with solid bone, large and strong ligaments, firm muscles, etc., the added weight of useless fat combined with the deficient tissues is likely to be a factor in causing skeletal defects. The burden of obesity has been accurately determined through tests with an ergometer on the mechanical efficiency of overweight, normal, and underweight persons by Wang et al. (*Arch. Int. Med.* 45:727, May '30). The deviation of the obese group from the standard varied from +110 to +12, that of the normal from +8 to —8, while that of the underweight from —15 to —27. The mechanical efficiency, however, varied inversely with the percentage of overweight or 21.7% for the obese, 24.4% for the normal, and 27.6% for the underweight. In another article (*Arch. Int. Med.* 45:1004, June '30) the influence of fatigue on mechanical efficiency was determined in three similar groups. The results obtained in these tests were very varied, but the average value was lowest in the obese and highest in the normal group.

In an excellent discussion on the management of obesity, Wilder (*J. Am. Diet. Asso.* 6:91, Sept. '30) has enumerated many points of value to reduce an excess of fat. He writes that the chief problem is to curtail the intake with a minimum of injury and discomfort. "The patient must be trained. Without his intelligent coöperation nothing happens. He must also want to reduce, and must understand how to do it. A too rapid reduction may impair strength of heart or nervous system. A reduction that requires more time results in establishing new food habits, so that afterward the patient finds himself able to hold his new weight without conscious effort. . . . A weight loss of two pounds a week is as much as should be sought, and one pound is quite enough after the first ten or twenty pounds have vanished. . . . The total calories may be more or less arbitrary. . . . With individuals of average height this amounts to about 1500 calories. The basal requirement of 100 grams of protein will account for 400 calories, leaving 1000 or more to be supplied by the fats and carbohydrates. . . . It is well to forbid all sugar, candy, and pastries, and to insist on the liberal inclusion of leafy vegetables and citrous fruits. . . . The necessity for reduction exists only when people are overweight. . . . Many women have done themselves permanent harm in their emulation of certain cinema actresses. . . . Much weakness, anemia, and psychasthenia is due to the current styles of women's clothes. . . . In addition, there are people who should be reduced with extreme caution because their hearts are weak, their kidneys damaged, or they are old and arteriosclerotic." An extreme and perhaps an unreasonable point of view in the dietary correction of obesity has been taken by Strang et al. (*Am. J. M. Sc.* 179:687, May '30). In this study, the patients were kept in a hospital for a period of about three months. For a week or so they were given a liberal preliminary diet, then the food was restricted to about 58 gms. of protein, 14 grams of carbohydrate, and 8 grams of fat, or 360 calories. The patients lost from 5 to 104 pounds according to the length of time the diet was adhered to. Complications did not occur, but the subsequent or permanent results obtained after the patients left the hospital were not alluded to. Observations on alimentary hyperlipemia in man have been carried out by Hejda (*Am. J. M. Sc.* 180:84, July '30). The amount of fat normally in the blood varies between 0.5-0.7%. For the purpose of carrying out a fat tolerance test, the fasting lipemia was first determined, then a fat meal of 50 grams of butter, one roll, and 250 cc. of coffee with cream was ingested, and five tests

of the blood were made at 90 minute intervals. In the normal person a hyperlipemia appears between the second and third hours after the fat meal, reaches a maximum between the fourth and fifth hour, but returns to normal at the sixth hour. In patients with gastroptosis, atrophy of the pancreas, jaundice, and carcinoma of the pancreas, the lipemia did not change for five hours and then there might have been a slight rise; but with diabetes mellitus, the initial rise was rapid and kept on ascending even after the sixth hour.

Rony and Ching (*Endocrinology* 14:355, Sept.-Oct. '30) have made an inquiry into the effect of certain hormones on fat metabolism, by testing the lipemia of dogs after a fat meal of 2 cc. of olive oil per body pound, after starvation, the ingestion of glucose, and in the injection of insulin, epinephrin, and pituitrin. They found that starvation increases, and abundant feeding decreases the lipemia. Glucose by mouth or parenterally inhibits lipemia in fasting dogs, and while insulin and epinephrin had no effect on the blood fat of fasting dogs, insulin inhibited alimentary lipemia. Finally, epinephrin and pituitrin did not influence alimentary lipemia. From these results they conclude that carbohydrate metabolism plays an important rôle in the regulation of the blood fat level of dogs during the absorption of fat. The results of a noteworthy study have been written by Mendel (*Yale J. Biol. & Med.* 3:107, Dec. '30) on some relations of diet to fat deposition in the body. The outstanding carbohydrates of animals are the polysaccharide glycogen and its derivative sugar, glucose. These are supposed to be the same in all animals and cannot be altered, even by marked variations of diet. The proteins, too, exhibit certain remarkable constancies of chemical character. The fats of the body, on the other hand, are decidedly different. Fatty substances do occur in cells as a fairly constant and characteristic component regardless of the state of nutrition of the animal. Larger amounts of fat, however, tend to segregate in connective tissues and are conspicuous in certain regions. These fats consist almost entirely of the glycerides of palmitic, stearic, and oleic acids, with small amounts of the esters of other fatty acids. In this adipose tissue there are not only marked variations among the fat mixtures of different species, but within the same species marked differences occur. Of this depot fat about 50% is subcutaneous, 20% genital, 12% perirenal, 10% mesenteric, 5% intermuscular, and 3% omental. In experiments with young albino rats, 83% of cornstarch, Crisco, mutton tallow, or soy bean oil were added to a complete basic diet, which the animals consumed until they reached a certain weight. Then they were killed and the depot fat analyzed. The results obtained were "that the chemical character of the fat stored is unmistakably modified or determined by the nature of the dietary precursors, so that its iodine number may vary between 123 and 35". The fat reserves are early drawn upon in times of need. By various depleting procedures, such as partial starvation and exercise, all of the depots contribute, and none is completely depleted before the others are drawn on for a quota of their reserve energy. With the growth of knowledge it is becoming increasingly probable that even pathological fat found in the human liver, heart, or kidneys is closely related to the usual physiological fat deposits, and the older doctrine of fatty degeneration has given way to the more tenable hypothesis of fatty infiltration of the tissues.

The dietetic production of temporary diabetes mellitus in healthy persons has been described by Frank and Leiser (*Med. Klin.* 25:1841, Nov. 29, '29). A diet deficient in carbohydrates and proteins was given twelve healthy persons, after dextrose tolerance had been found normal, for periods of three to four, six to nine, and eleven to sixteen days. Each person was given 100 grams of carbohydrate the day after the diet ended, and by repeated tests of the urine and also tolerance tests for three days, the temporary diabetes was readily determined. A simplified method for controlling diabetes has been elaborated by Curtis (*J. Michigan M. Soc.* 29:355, May '30). The diet largely based on the work of Newburgh and Marsh, contains a large amount of fat and does not seem very palatable. Nixon (*Brit. M. J.* 1:326, Feb. 22, '30) makes a logical plea for a moderate carbohydrate diet in diabetes. In his argument he writes that contentment and satisfaction are secured, the regimen more readily observed, the danger of ketosis is removed, arteriosclerosis is delayed, and a fat poor diet increases carbohydrate tolerance and the prospects of pancreatic regeneration. Foster (*J. A. M. A.* 94:1974, June 21, '30) has written a very practical article on foods and diets in diabetes.

IV. PROTEIN FOOD, THE ANEMIAS, HIGH BLOOD PRESSURE, AND NEPHRITIS

A useful summary on the treatment of the anemias, especially those of the secondary type, has been published by Murphy (*Surg., Gynec. Obst.* 50:246, Jan. '30). The anemias are classified according to the cause. In an anemia due to an acute loss of blood, the reserve of iron is not depleted and a rapid improvement will occur on a normal diet. If the anemia is severe a transfusion may be necessary. In an anemia due to a chronic loss of blood the source of bleeding must first be stopped, then liver and iron in sufficient amounts rapidly restore the depletion. Liver extract is not beneficial in this type. In the anemias of a nutritional or chlorotic type, an improvement often takes place from the ingestion of red meat, green vegetables and fruit. The anemia of pregnancy is improved by large

amounts of liver or iron, but liver extract has no effect. In an anemia due to chronic infection, the cause must first be removed before liver or iron will produce a beneficial effect. The value of liver and iron in the treatment of secondary anemia has been studied by Keifer and Young (*J. A. M. A.* 93:575, Aug. 24, '29). The daily rate of hemoglobin regeneration was determined on patients anemic with various diseases, who were allowed to recover spontaneously and served as a control group. The same procedure was carried out with another similar group of patients, each of whom received 1.8 grams of ferrous carbonate a day; and in a third group, the patients were given liver and iron. The result of treatment was that in the control group the rate of hemoglobin regeneration was seldom more than 1% a day and the reticulocytes were low. In the second group treated with iron, the hemoglobin regeneration was between 1 and 2% and the reticulocytes were in moderate numbers; whereas in the third group that had liver and iron in combination, the hemoglobin regeneration was between 1 and 4% and there were many reticulocytes in the blood of the patients. The same authors (*Nat. M. J. China* 15:701, Dec. '29) have also observed the anemia of undernutrition; and find that the condition improves with the addition of the specific vitamin to the food or the ingestion of adequate diet, unless the patients have a severe infection. In a newer conception of nutrition, Weston (*J. A. M. A.* 95:834, Sept. 20, '30) believes that in the anemia of infancy the mineral content of milk should be strengthened by the addition of a spinach, lettuce, or carrot top concentrate. The concentrate is made by drying these vegetables and then grinding them into a very fine powder. Half a teaspoonful of the powder is added daily to the milk of an infant. In this way the iron, manganese, copper, and iodine content of the food is increased many times, and has been found especially useful in combating alimentary anemia. An infant with nutritional edema associated with severe anemia has been reported by Marcus (*J. Med. Soc. New Jersey* 27:978, Dec. '30). When first seen, the infant was very pale, had edema of the legs, a systolic murmur, and a hemoglobin of 20%. The condition was due to a very limited diet of breast milk, potatoes, and chocolate pudding. After five weeks on a good diet, supplemented by iron and arsenic, and the ultraviolet ray, all of the symptoms disappeared and the hemoglobin had increased to 70%.

In an attempt to diagnose and treat pernicious anemia earlier, Wilkinson and Brockbank (*Acta. Med. Scandinav.* 74:211, Fasc. III, '30) have brought out a good point. The early manifestations of this disease are very protean, but in patients with weakness and anemia, persistent diarrhoea, a chronic sore tongue, or paresthesia, pernicious anemia should be suspected and treatment begun. In this way the degeneration of the cord may be prevented and a crippling disorder avoided. Silvermann (*New Orleans M. & S. J.* 83:357, Dec. '30) makes a similar plea for the recognition and treatment of patients suspected of pernicious anemia from a consideration of gastrointestinal disorders, especially diarrhoea and achylia gastrica. In another paper by Wilkinson and Brockbank (*Clin. J.* 59: 475, Oct. 1, '30) they also advocate, with liver diet, the administration of three parts of glycerinum pepsini (B.P.) and one part of acid hydrochlor. dil. (B.P.) in eight ounces of water, and flavored with orange juice. Two drams of this digestant sipped throughout each meal prevents flatulence and diarrhoea.

A critical review of the liver treatment of the anemias has been compiled by Vaughan (*Quart. J. Med.* 23:213, Jan. '30). In this comprehensive review of most of the articles published on the value of liver treatment, some of the conclusions expressed are: that liver is a certain remedy in those forms of anemia characterized by megaloblastic hyperplasia of the bone marrow, such as idiopathic pernicious anemia, sprue and the pernicious anemia of pregnancy; that the action of liver is dependent on its inorganic salt content and a complex polypeptide; and that the anemia is a deficiency disease, and without the ingestion of liver or kidney, the bone marrow is unable to produce corpuscles normally. The desiccated and defatted stomach of hogs has proved as effective as liver in the treatment of pernicious anemia, according to the report of Sturgis and Isaacs (*Am. J. M. Sc.* 180: 597, Nov. '30). In this treatment 10 grams of the preparation for every 1,000,000 deficit of corpuscles are mixed with tomato juice and consumed daily like a cereal. The average increase of corpuscles is about 500,000 a month; thus bringing about as rapid a response as liver therapy. The generation of corpuscles in normal men from the daily ingestion of 500 grams of raw or fried liver for a few weeks has been observed by Neidhardt and Bannasch (*Ztschr. f. klin. Med.* 111:147, Sept. 12, 1929). They find that there is a definite increase in the number of corpuscles, but a less marked increase in the percentage of hemoglobin in the blood.

The potency of liver extract in the treatment of a severe anemia of fowls has been studied by McGowan (*Edinburgh M. J.* 37:330, June '30). The extract has a marked beneficial effect on the blood, not so much on the marrow; and in some of the birds, relapses occurred. At this point if iron is also administered a more beneficial and stable effect is obtained. A subacute combined degeneration of the cord in primary anemia of the fowl has also been observed by McGowan (*Brit. M. J.* 2:204, Aug. 9, '30). On the other hand, Vaughan et al (*Brit. J. Exper. Path.* 11:456, '30) have studied the response of

grain-fed pigeons to substances effective in pernicious anemia. Such birds fed for several weeks generally show a reticulocyte count of about 10%, and therefore a change in these cells from various foods would be significant of their potency. The result obtained was that effective liver preparations brought about a pronounced increase in the reticulocytes. Beefsteak caused a similar response. But a liver preparation inert for pernicious anemia, a liver extract in which the active principle had been destroyed, vitamin B and G, histamine, sodium chloride, or casein, did not produce an increase of these cells. An anemia produced in dogs by feeding onions has been observed by Sebrill (*Pub. Health Rep.* 45:1175, May 23, '30). The condition was discovered during an experiment to determine the value of onions for the prevention of black tongue. More than 15 grams of onions per kilo of body weight must be consumed daily to produce the anemia.

The necessity of a dietary regimen of patients with heart disease and the nutrition of the heart has been pointed out by Loefer and Lemaire (*Presse med.* 38:233, Feb. 15, '30). For proper feeding of these patients not only has an influence on the general condition of the patient, but also reacts on the equilibrium of the heart. Then dyspepsia should be prevented and acidosis controlled by a diet low in calcium and chlorides. An increase in the ingestion of sugar has a peculiarly beneficial effect. The influence of a diet with and without meat on human blood pressure, has been investigated by Saile (*Med. Klin.*, 26:929, June 20, '30). He made an examination of 110 monks who live on an exclusive vegetarian diet and of 115 monks whose food includes an ordinary amount of meat, and found that 70% of the latter had a pressure of more than 120, whereas only 25% of the vegetarians had a pressure above this figure. Furthermore, the average age of the meat eating monks was below the other group. A more detailed account of the condition of Stefansson and Andersen, who subsisted for more than a year on a meat diet, has been written by McClellan (*J. Am. Diet. Asso.* 6:216, Dec. '30). The men ate approximately 100 to 140 grams of protein, 200-300 of fat, and 7-12 of carbohydrates daily. Albumin or casts were not seen in many tests of the urine, the nitrogenous elements in the blood were not increased, and the calcium and phosphorous balances were not disturbed. Recently Newburgh et al. (*Am. J. M. Sc.* 179:305, March '30) have reported a human experiment, in which the subject consumed 338 grams of beef muscle and liver daily for six months. The result was that albuminuria and a great increase of casts developed but the blood pressure remained unchanged. Ten days after the high protein diet was discontinued the urine became normal.

In an experiment from high protein feeding and unilateral nephrectomy during reproduction and lactation in the rat Parsons et al (*Arch. Path.* 10:1, July '30) have made some interesting observations. Renal lesions were observed in a few of the animals that were subjected to the greatest reproductive strain and consumed the food for four to six months. Lactation and gestation together caused a greater enlargement of the kidney than gestation alone. The kidneys of the young born of mothers on high protein diets weigh more in proportion to body weight at the time of weaning than do those from the young of mothers consuming a low protein diet. The effects of a high protein diet on the growth of fibroblasts in the healing wounds have been studied by Harvey and Howes (*Ann. Surg.* 91:641, May, '30). One group of control rats was fed a balanced ration, another a high protein diet. After a week on the diets, a wound a centimeter in length was made in the anterior surface of the stomachs of all the animals and brought together with catgut. On fourteen successive days after the operation six animals of each group were killed, the stomachs ligated, and the tensile strength of the wounds determined by inflation through the insertion of a cannula connected with a manometer. The strength of the wounds was the same for both groups up to the time of healing; but after organization had begun the wounds of the animals on the high protein diet healed the more rapidly.

V. THE NUTRITIVE APPARATUS, ACID-BASE BALANCE, AND ANABOLISM

If the alimentary canal forms a highly perfected nutritive apparatus that was designed to digest and absorb nutrient substances from the food for the development and maintenance of tissue cells, its action is very complex and is influenced by many factors in the digestive system. A comprehensive analysis of the gastric secretion of many (so-called) normal persons over sixty years shows very varied results. The results of the work carried out by Davies and James (*Quart. J. Med.* 23:1, Oct. '30) were that 43% had a normal secretion, 13% had a high, 12% had a diminished, and 32% had no free hydrochloric acid secretion. By the use of histamine, the percentage of those with achlorhydria was equally divided between the true and apparent types. All the persons secreted some pepsin, and this was more constant under emotion than the hydrochloric acid. Anemia and atrophic changes in the mucous membrane of the tongue were found often in those with a diminished gastric secretion. Emery (*New Eng. J. Med.* 203:785, Oct. 16, '30) has attempted to determine the relation of achlorhydria to diarrhoea in some hospital records, but finds in forty-seven patients that the action of the digestive system is too variable to be significant. Fauley and Ivy (*Arch. Int. Med.* 46:524, Sept. '30)

have observed the effect of the consistency of food on experimental gastric ulcers, and found that in rabbits a simple ulcer will heal in thirty days irrespective of the food; but one formed with a silk suture in the base tends to heal with a smooth, but becomes chronic with a rough, food.

The reaction of the human duodenal contents to acid and alkali meat mixtures has been studied in a few patients by Mettier (*J. Clin. Investigation* 8:561, June 20, '30). The acid meat adjusted to pH3 in patients made the gastro-duodenal contents acid to pH4; and the alkaline meat with a pH of 8 changed the contents to pH7.8. The contents kept at this reaction for two hours in patients with hydrochloric acid, and from two to three hours in patients with achlorhydria; but the acid condition was constant for one and a half to two hours with free hydrochloric acid and from three to four hours in patients with achlorhydria. The influence of feeding on certain acids in the feces of infants has been studied by Gerstley, Wang and Wood (*Am. J. Dis. Child.* 39:487, March '30). They found that when human milk is replaced by cow's milk in infant feeding, formic acid disappears, acetic acid predominates, and propionic acid appears. On human milk, too, the total acid excretion is less, but the lactic acid is increased. When lactose is added to human milk these authors (*Am. J. Dis. Child.* 39:729, April '30) found that there was little change in the pH of the feces, but added to cow's milk made the feces more acid. Three per cent. of lactose added to cow's milk causes an increase in the output of volatile acid, of lactic acid, and in the total titratable acidity. Some of the chemical considerations from these investigations are described by Gerstley (*Am. J. Dis. Child.* 40:27, July '30). The feces of infants fed on human milk are not so heavy, but give a higher pH reaction even with diarrhoea. Lactose is not the cause of the diarrhoea, and changing the lactose in the milk has more influence on the absorption of nutrient substances than intestinal fermentation. All of the studies suggest that the diarrhoea of infancy is not due to the indigestibility of cow's milk but rather to its effect on the metabolism with intestinal involvement as a complication.

Mann and Bollman (*J. A. M. A.* 95:1722, Dec. 6, '30) have devised a method for estimating the pH contents of isolated intestinal loops in various sections of the digestive tract of dogs. In the fasting stomach the reaction was pH1.5 to 2, but immediately after a meal it rose to pH4, in two hours it became reduced to pH2, and after four hours to pH1.5. In the fasting duodenum the reaction was about pH7.6, but after a meal the reactions changed a good deal like the stomach. In the jejunum and ileum the fasting condition was about pH7.6, which was changed by a meal to about pH6.5. The reaction of the colon depended somewhat on the diet; with a mixed diet the pH was about 7.4, but a diet largely of carbohydrates reduced the reaction to the acid side of pH5.5. "Dietary measures may greatly alter the acidity of the gastro-intestinal tract. Samuel and Kugelmass (*Am. J. Dis. Child.* 39:687, April '30) have observed the effect of feeding acid-forming and base-forming diets on the metabolism of rats. The acid diet of egg, rice, and oatmeal and the alkaline one of powdered milk, potato, beans, and dextrin were almost identical in protein, fat, carbohydrate, and vitamin content. The acid diet inhibited growth, depressed the serum phosphorus, the alkali reserve, and the pH, with a compensatory rise in the chlorides, sugar, and cholesterol of the blood. Rickets was evident in the animals fed the acid diet, grossly by thoracic deformities and enlargements of the costochondral junctions, and, microscopically, by a large amount of osteoid tissue, wide and irregular metaphyses and swollen cartilage cells. The alkaline food produced only slight changes in bone and cartilage. Dean (*Am. J. M. Sc.* 179:828, June '30), has observed the reaction of a fistula of the ileum of dogs on varied diets. Mixed and high protein diets gave a pH of 7.86, whereas with high fat and high carbohydrate diets the pH was 7.42.

An interesting study has been made by Childrey, Alvarez, and Mann (*Arch. Int. Med.* 46:361, Sept. '30) on the digestion of various foods in dogs without a colon. The foods best digested were meat, rice, dextrose, and fat in small amounts. The combination of bread and milk and raw eggs and milk improved the digestion of both substances; but lactose, cheese, lard, and lemon juice in combination with other foods had a laxative action. Meat in masses was better digested than when finely comminuted. Raw meat was better digested than cooked meat. When an attempt was made to give the animals too much food partial regurgitation generally occurred. Raw eggs or cornstarch alone were very indigestible. Anxiety and emotion interfered with digestion. Food taken in one large amount was better utilized than when the same amount was divided and ingested at short intervals. Purgatives, sodium bicarbonate, and barium sulphate interfered with digestion. The absorption and excretion of iron in the intestines of fowls have been studied by McGowan (*Edinburgh M. J.* 85, Feb. '30). He finds that in the pernicious anemia of these animals the iron found in the intestines, when the birds were fed on ordinary diet, was due to the excretion of considerable quantities of "blood" iron. On the other hand, when "ionic" iron is fed to normal fowls on an ordinary diet, a large amount of iron is found in the intestines. It seems probable that the absorption and excretion of "ionic" iron occur in the same place in the intestine by a mechanism which has a reversible action. Copper appears to have a catalytic effect in rendering "ionic" iron available to the

body for the formation of hemoglobin, but a deficiency of copper can play no part in the anemias due to malnutrition. A very complete account of the rôle of hormones in digestion has been compiled by Ivy (*Physiol. Rev.* 10:282, April '30).

In an illuminating address before the British Association for the Advancement of Science, Raper (*Lancet*, 2:509, Sept. 6, '30) has outlined the synthetic activities of the cell. "The animal cell has a very limited choice of raw materials from which synthesis must start. These are components of the common food stuffs. When they have undergone the preliminary processes of digestion they provide in all about thirty substances which may be regarded as available for the building up of new compounds by the cell. They consist of about twenty amino-acids, two purine bases, three pyrinidine bases, three hexoses, glycerol, and higher fatty acids. . . . There may be other hitherto undiscovered components of food stuffs, which are important as raw material for synthesis in the animal cell, but they can be but few in number and present in small amount." The greater portion of the address is devoted to a discussion of the specific synthetic activities of cells in the conversion of the amino acids, hexoses, glycerol, etc., into protoplasm.

VI. THE NOURISHMENT OF THE YOUNG AND CALCIUM AND PHOSPHOROUS METABOLISM

The relations of nutrition to the healthy development of the young continue to receive commendable attention. Kerley (*J. M. Soc. New Jersey* 27:39, Jan. '30) writes on the thin well child, and notes that there is always an imbalance between the food intake and energy expanded. In treatment he advises a reduction of the child's activities by having him stay in bed until mid morning, rest after dinner, and consume sufficient vegetables, some fruit, and at times cod liver oil. The nitrogen metabolism of children has been observed by Parsons (*Am. J. Dis. Child.* 39:1221, June '30). With a group of five children, a low protein diet of 2.2 grams per kilogram and less was prescribed, and then the nitrogen output determined daily by Kjeldahl determinations of the urine and feces for one to two months. The results showed that these children could maintain a positive nitrogen balance on 1.1 grams of protein per kilogram, but the diet has to be increased with an isodynamic equivalent of carbohydrate or fat. The food requirements of thirteen chronic sick, especially tuberculous, children has been studied by Peterman and Hug (*Am. J. Dis. Child.* 40:305, Aug. '30) for a period of several months. All children were given 10 grams of cod liver oil and 1 ounce of orange juice daily throughout the time of observation. For a control period of five weeks they were observed on the house diet; then during other periods, whole milk was substituted for malted milk, or malted milk was given with whole milk, or 12 grams of vitamin B, or 14 grams of yeast, were added to the diet. The results obtained were that five lost or gained less than a pound, the others gained from two to ten pounds, and only those who received 46% or more calories required for their "normal" surface area made satisfactory gains. The vitamin B or yeast preparations had no effect on the appetite of the children.

The nutrition of children on a mixed and on a vegetable diet has been studied by Lane and Bosshardt (*Am. J. Dis. Child.* 40:285, Aug. '30). Twenty-six children from seven to fifteen years were divided into four groups, given different diets, and observed for ten weeks. One group was given a mixed diet, another a mixed diet with cod liver oil, a third a vegetable diet without milk, and the last a vegetable diet without milk but supplemented by cod liver oil. The results obtained were that the vegetable group gained slightly more weight and also showed a greater increase of hemoglobin than the mixed diet group. In an excellent article on minor disturbances of nutrition in infants, Laurie (*M. J. Australia* 288, March 1, '30) pleads for the early recognition of deviations from health. To keep the infant from becoming malnourished, he strongly advocates diminished cereal foods, and more protein, vegetables, and fruits. In order to improve the nutrition and health of French children a commission has been appointed by the Academy of Medicine, to recommend a rational diet to the directors of boarding schools and lycées (*Foreign Letter. J. A. M. A.* 95:212, July 19, '30).

The dietetic treatment of digestive disturbances of infancy has been considered by Moll (*Rev. franc. de pédiat.* 6:177, '30) and a measure advocated that is very beneficial. On the belief that an excess of protein causes a very irritable colon, diarrhoea, and acid stools, he boils milk with calcium lactate, makes a filtrate, which is added to breast, almond milk, or a cereal pudding. Since using this procedure, the mortality from severe diarrhoea has been reduced from 32 to 5%.

Several observations on celiac disease have appeared during the year. One by Kerley (*Arch. Pediat.* 47:24, Jan. '30) presents six patients, five of whom were given a casein, starch, and sugar mixture, with satisfactory results. The sixth improved slowly on protein milk in different forms. Another article by Nelson (*Am. J. Dis. Child.* 39:76, Jan. '30) reports the use of a mixture of skimmed milk, egg white, cottage cheese, and sieved liver. Recovery was slow but took place in months and years. Bananas in various forms were tried without benefit.

The results of an excellent, illuminating, and very comprehensive investigation have been published by Telfer (*Glasgow M. J.* 113:246, May

'30) on mineral metabolism in infancy. He analyzes the mineral constituents of human and cow's milk for a lactating period of a year, and finds the former to have an average of 0.19 grams per cent. of ash, 0.043 of calcium oxide, 0.006 of magnesium oxide, and 0.00008 of iron; whereas cow's milk has an average of 0.73 grams per cent. of ash, 0.166 of calcium oxide, 0.018 of magnesium oxide, 0.21 of phosphoric acid, and 0.00008 of iron. Then in order to determine the retention of these elements in feeding at intervals during a year the infants were carefully weighed before and after each nursing to know the intake, and the feces were exactly analyzed to find out the minerals absorbed. With human milk these investigations show that the mineral composition of this food is closely adjusted to the growth needs of the infant; and all of the elements are retained in the same proportion as they are provided. Over the entire period of breast feeding this is about 60% of the intake. In a similar way the retention of the elements after feeding with cow's milk was determined. The results obtained were that the percentage retained is reduced, but the bone forming elements much increased, and the iron much diminished. The fecal weight of the elements is also much higher, and their composition changed, with the exception of iron, by an increase of fat and minerals. In a comparison of the two foods, the following points have been established. "On cow's milk the intake of calcium, magnesium, and phosphorus is four times greater than on human milk, and the increased retention of the bone forming elements is due to the larger quantity available for absorption and fixation by the growing tissues. . . . Owing to the high concentration of the bone-forming elements, the mineral intake as a whole is less effectively absorbed and utilized than the small intake afforded by human milk, which is accurately adjusted to the infant's requirements and conditions of absorption. As the iron component of the mineral intake is approximately the same in quantity on the two milks, the amount of iron absorbed and retained on cow's milk is reduced." Linder and Harris (*Quart. J. Med.* 23:195, Jan. '30) have observed the calcium and phosphorous metabolism in chronic diarrhoea with tetany in adults. They found that the immediate cause of the tetany was calcium deficiency; but the inorganic phosphorus of the serum was very much reduced and in two patients almost absent in the urine. In one patient the decalcification of bone progressed to such an extent that spontaneous fractures occurred. From the soap and total fat excretion and the response to treatment, the condition was evidently due to a vitamin D deficiency. In treatment, fat restriction and the administration of large doses of irradiated ergosterol were effective. The significance of calcium and phosphorous metabolism in health and disease has been reviewed by Hunter (*Lancet* 1:897, 947 & 999, Apr. 26, May 3 & 10, '30) in the Goulstonian Lectures. The article is a very complete and exact review of the subject.

VII. VITAMIN A DEFICIENCY AND SPECIFIC INFECTION

The association of keratomalacia with other deficiency diseases has been noted by Weech (*Am. J. Dis. Child.* 39:1153, June '30) in Chinese children. These children frequently consume a diet deficient in vitamins A and D. Half of the patients observed had rickets; one an enlarged heart and edema, and improved by ingesting yeast; two had purpuric spots, but were without any other evidence of scurvy; five had edema; and most of the children had a moderate anemia. All of them showed unmistakable signs of malnutrition, and the conclusion was reached that their diets were qualitatively and quantitatively insufficient. Interesting observations have been made by Aykroyd (*J. Hyg.* 30:376, Aug. '30) on night blindness (functional nyctalopia) in the fisher folk of Labrador and Newfoundland. The disorder occurs most frequently in the late summer, and in those who have migrated from their homes in fishing boats. Under these circumstances they consume a limited food of white flour, biscuit, salt beef and pork, molasses, margarine, potatoes, beans, and peas. Eggs, canned milk, or fresh vegetables are not often available. The condition yields immediately to vitamin A-containing foods.

In an experimental study on the effects of vitamin A deficiency and infection, Lassen (*J. Hyg.* 30:300, Aug. '30) infected two groups of rats with paratyphoid bacilli. One group was made deficient on food without vitamin A and ocular lesions appeared; and the other used as a control was given a complete food. Autopsies and bacterial cultures were made on all of the animals. The results obtained were that deficiently fed animals succumbed much more rapidly than those in the control group; and thus demonstrated a lowered vital resistance to infection. The response of the monkey to the withdrawal of vitamin A from the diet has been observed by Tilden and Miller (*Jour. Nutrition* 3:121, Sept. '30). The first sign apparent in these animals was diarrhoea, and this was soon followed by loss of weight. As the effects of the deficiency became marked an attempt was made to produce trachoma by injections of B. Granulosis but ocular lesions of any sort did not develop. Infections of the sinuses or tongue abscesses were not observed. The chief lesions found in postmortem examinations were a keratinization of various epithelial tissues, and an ulcerative colitis. Kendall and Gifford (*Arch. Ophth.* 4:322, Sept. '30) have attempted to induce trachoma in deficiently fed rats, with cultures of B. Granulosis; but in spite of reducing some of the animals to a point of kerato-

malacia, none of the inoculations were successful.

Mellanby (*Brit. M. J.* 1:677, April 12, '30) points out the value of ingesting sufficient vitamin A in the treatment of puerperal septicemia. Of nine patients receiving this treatment from the beginning of the infection, eight recovered. From the investigation of Burton and Balmain (*Lancet.* 1:1063, May 17, '30) the increment of vitamin A to the diet of fifty-three pregnant women did not have any effect in increasing the resistance of the body to a streptococcus infection. The investigators also tried the effect of vitamin A on one group of sixty-four patients with scarlet fever, and at the same time observed a control group of fifty-three without a supplemental amount of the vitamin. In both groups the immunity of the patients was determined by Dick tests; and only five per cent. more of the patients without the increase of the vitamin were found positive than those of the other group. Eighteen minims of radiostoleum were administered daily to the pregnant women and scarlet fever patients.

An exact study of the changes that occur in the respiratory tract of chickens caused by a vitamin A deficiency has been made by Seifried (*J. Exper. Med.* 52:519, Oct. 1, '30). The epithelium at first becomes atrophied and degenerated, but later this is replaced by a squamous stratified keratinizing epithelium. Such changes destroy the ciliated epithelium and the cells that produce a bacteriocidal secretion. On this account secondary infections frequently occurred. In another investigation (*J. Exper. Med.* 52:533, Oct. 1, '30) lesions of the upper alimentary tract were studied in relation to some infectious diseases. From this work it was found that keratinizing epithelium and necrotic material block the ducts of many of the secretory glands. In this condition, too, secondary infections were frequently found and afforded a means for bacteria and other viruses to enter the body. In an investigation of the bacteria developing in the nasal cavities and middle ear of rats deprived of vitamin A, Turner et al (*J. Infect. Dis.* 46:328, April, 1930) found the infections due to Staphylococcus Aureus, B. Coli, M. Catarrhalis A, and chromogen 6.

VIII. BERIBERI AND NERVE DISORDERS

As beriberi is generally seen in the tropics and is often considered a tropical disease, Aykroyd (*J. Hyg.* 30:357, Aug. '30) has made a real contribution by a description of the disease as it occurs in subarctic regions. During a period of fifteen years one hundred and seventy-four patients with beriberi have been admitted to one of the Grenfell hospitals of northern Newfoundland. In an analysis of the cases he found men to be four times as susceptible to the disease as women, but with both sexes it usually occurs between the ages of sixteen and thirty-five; and frequently appears in women during lactation. The symptoms of the disease in the north are not dissimilar to those occurring in patients elsewhere. The disease is brought about by poverty and a very reduced food supply during the winter months; for unless vegetables are grown in the summer and stored, the food toward spring, when the disease is most prevalent, may oftentimes become decreased to bread and tea. All patients are readily cured by a good mixed diet, and without a large consumption of vitamin B. Swineford (*Virginia M. Monthly* 56:814 March '30) gives an outline of beriberi in Virginia with a very detailed report of a case. Wechsler (*M. J. & Rec.* 131:441, May 7, '30) reports several unrecognized cases of polyneuritis in New York City. While the patients recorded did not have all of the cardinal signs necessary for an exact diagnosis, the fact that they improved only with a high vitamin B diet, makes the neurological disorder more than probable. A comprehensive clinical study of the heart in beriberi has been made by Keefer in China (*Arch. Int. Med.* 45:1, Jan. '30). The author notes that the mechanism of cardiac insufficiency from a vitamin B deficiency is due to changes in the heart muscle characterized by cardiac enlargement, deficient contractile power, and sometimes to altered conductivity. Those that develop cardiac insufficiency from too much exercise have the least involvement of the nervous system.

The vitamin B and vitamin G requirements of the mouse have been determined by Bing and Mendel (*J. Nutrition* 2:49, Sept. '29). In the absence of vitamin B death occurs in about three weeks, and without vitamin G the animal may live for some time but pellagra-like lesions appear. The survival of the animal may be due to a small amount of vitamin G that the vitamin B food still retains. Rowlands and Browning (*Lancet* 180, Jan. 28, '28) describe an atony of the stomach of rats due to the absence of vitamin B from the diet. They also found that the detoxicated embryo of cereals has a much more potent effect than yeast in curing pigeons and rats suffering from polyneuritis. Cowgill, Rosenburg and Rogoff (*Am. J. Physiol.* 95:537, Dec. '30) have observed that the consumption of large amounts of water delays the time for the anorexia to appear in dogs on a diet without vitamin B. Seidell and Smith (*Pub. Health Rep.* 45:3194, Dec. 26, '30) have made an acetone concentrate of vitamin B which has been purified by platinic chloride. This preparation is a highly active anti-neuritic fraction, which appears to be entirely free from the thermostable component of vitamin B.

The value of the ketogenetic diet in the treatment of epilepsy in two hundred and seventy-two patients over a period of eight years has been discussed by Helmholz and Keith (*J. A. M. A.* 95:707, Sept. 6, '30). About one half of

this number failed to coöperate or have been treated for such a short time that they have been excluded. Of the remainder, forty-three were cured, thirty-two were improved, and sixty-six were not benefited. A more detailed and comprehensive review of the effects of the ketogenetic diet has been written by Talbot (*The Treatment of Epilepsy*, Fritz B. Talbot, the Macmillan Co., New York, 1930). On the other hand, Greer (*J. A. M. A.* 95:863, Sept. 20, '30) reports pellagra-like lesions in a patient from the results of the ketogenetic diet. Guthrie (*J. A. M. A.* 95:1912, Dec. 20, '30) reports a similar case.

IX. SCURVY, PELLAGRA, AND SKIN DISEASES

The treatment of scurvy and the associated anemia with food especially rich in vitamin C has been studied by Mettier, Minot, and Townsend (*J. A. M. A.* 95:1089, Oct. 11, '30). In this investigation, a third of the patients were found to have a corpuscle count of two to three, another third three to four, and the remainder over four million corpuscles to the cubic millimeter. The anemia is of the secondary type with a color index of about one, and a slight change in shape, but more often an abnormal variation in the size of the corpuscles. There are also few discolored cells, and nucleated cells have been seen. In the treatment of one group, some of the patients were given foods rich in vitamin C, and there was an immediate response of the reticulocytes and an increase in the corpuscles. On the supposition that iron would improve the anemia large doses of iron and ammonium citrate were tried on another group, but there was no response. Again with a third group liver extract was prepared without vitamin C and administered, but this treatment did not increase the number of reticulocytes. Liver pulp, however, known to contain vitamin C brought about an immediate and beneficial result in many patients. Gichner and Sherry (*J. A. M. A.* 95:9, July 5, '30) have studied two patients with scurvy. One living alone had not eaten any fresh fruits or vegetables for five years, while the other had consumed an almost exclusive diet of crackers and milk for several years. Both patients were given a general diet, orange juice, and sodium cacodylate, and made a striking and marked improvement. An abstract of fresh cabbage has been found very efficacious in the treatment of scurvy in infants by Rohmer (*Bull. Soc. de pédiat. de Paris* 27: 279, May 21, '29). The preparation was also given to several patients with celiac disease and a few with chronic malnutrition, and found beneficial when other treatment had failed. The results were ascribed to a physiological action of vitamin C.

The influence of experimental infections on bone changes in animals with scurvy has been observed by Baj (*Chir. d. org. di movimento* 14:477, Jan. '30). By injections of the staphylococcus albus into these animals the most constant results were found in the skeletal system. An infection does not influence the course of the deficiency disease, but is a serious complication compared to the same disorder in a normal animal. Dalldorf and Zall (*J. Exper. Med.* 52:57, July 1, '30) have confirmed the work of Wolbach and Howe on the changes that occur in the teeth of guinea pigs on a diet without vitamin C. In this interesting and exact piece of work the authors found that when the animals received insufficient vitamin C the highly specialized odontoblasts did not produce true dentin, but a dentinoid substance. With the complete absence of vitamin C the odontoblasts show even more regression, until they appear like fibroblasts. The curative effects of various fatty acids have been observed by Burr and Burr (*J. Biol. Chem.* 86:587, April '30) in rats, after scaly feet and dandruff had been produced by a fat-free diet. Butter and cocoanut oil were not effective; olive oil was found to be intermediate; but corn and linseed oil proved to be fair. Linoleic acid was found to be the most essential acid, but arachidic also may be necessary.

The use of yeast in the treatment and prevention of pellagra has been observed by Carley (*New Orleans M. & S. J.* 82:740, May, '30), in one hundred and seventy-six patients. He describes the details of the age and sex incidence, the signs and symptoms at the first examination, and the therapeutic results obtained from a daily dose of an ounce of dried brewer's yeast. The author notes that the use of yeast is merely palliative, and tides patients over an acute attack, until the diet can be extended to cure the disease. The yeast, however, greatly assists in allaying all symptoms of pellagra, and when used as a preventive measure its ingestion during the year prevented a recurrence of the symptoms of pellagra in thirty-eight patients during a period of thirteen months' observation. The development of pellagra through a primary disorder of the gastro-intestinal tract has been reviewed with the record of a case by Ellis (*Am. J. Dis. Child.* 39:1036, May '30). The patient had persistent and protracted diarrhoea, pellagra developed, but ultimately tubercle bacilli were found in the stools. The conclusion reached is that pellagra may develop as a complication of prolonged gastro-intestinal disease when the intake or absorption of food has been seriously interfered with. Guthrie (*New Eng. J. Med.* 201: 414, Aug. 29, '29) has made an interesting analysis of a group of mentally unbalanced pellagrins. Of the fourteen patients discussed only six were profoundly alcoholic. All of them ate peculiarly of food limited in amount or variety; and in many of them diarrhoea was a prominent and persistent symptom. The etiology of pellagra has been discussed by Aykroyd (*Brit. M. J.*

1:647 April 5, '30). He concludes from the fact that pellagra may be relieved by non-protein yeast and that rats may develop a pellagra-like disease on a diet containing some protein, that the evidence is against the theory that pellagra is due to an amino-acid deficiency. The distribution and properties of vitamin G (B_2) indicate that the vitamin hypothesis is the most plausible. On the other hand, Wilson (*Brit. M. J.* 1:101, Jan. 18, '30) maintains that a consumption of less than 40 to 45 grams of protein a day by man is likely to produce pellagra.

Investigations on the value of various foods in the prevention of black tongue in dogs were begun by Goldberger and concluded by his associates, Wheeler et al (*Pub. Health Rep.* 45: 1297, June 6, '30) and also Sebrell (*Pub. Health Rep.* 45:3064, Dec. 12, '30). In the first study lard, salt pork, dried green peas, and canned haddock were tested, but the fish in large amounts was the only food that prevented black tongue; the vegetables had a slight preventive action, and the fats were a poor source of the preventive factor. On all of the animals that died, postmortem examinations were made, and they were found to have fatty degeneration of the liver, and sometimes other organs. In the second article, liver extract was found to have a very definite effect in delaying the occurrence of black tongue, and when fed to dogs with the disease it is curative.

A frank and illuminating study has been made by Smithies (*Ann. Internal M.* 3:1201, June '30) on defective functions of the liver in patients with chronic skin diseases. In a group of nine patients with psoriasis, eczema, acne, etc., he finds that all of them had symptoms of indigestion or "biliousness"; and in spite of having tried numerous and varied forms of other treatment, skin lesions and the indigestion persisted. In treatment he drained the duodenum frequently, and prescribed a low fat and low protein diet, full doses of ox-bile, and small doses of the salicylates. Many of the patients he has relieved of constipation. The results obtained were that the "biliousness" was generally relieved, two of the patients with psoriasis were cured, and in all of the patients the condition of the skin was improved. Stokes and Pillsbury (*Arch. Dermat. & Syph.* 22:962, Dec. '30) discuss the influence of gastro-intestinal disorders on the condition of the skin in a very comprehensive and logical article. They write in part: "interest in the gastro-intestinal tract as part of the background of dermatologic etiology is achieving a belated though genuine arrival in this country. 'A suggestive piece of work . . . indicates that there is a distinct relationship between the well-being of the skin and the peristaltic gradient or progressive wave movement of the intestine from duodenum to caecum. . . . The pH of the intestinal tract is a most important element in the ability of the patient to absorb from his food. The chief irritability-reducer for his cellular metabolic mechanism.' " Seibert (*U. S. Veterans' Bur. M. Bul.* 6:1086, Dec. '30) reports two patients with skin disease who had tried many forms of treatment but the disease was relieved only after they had changed their ways of eating.

X. RICKETS, OSTEOMALACIA, CARIOUS TEETH, AND ARTHRITIS

The growth of bone and the development of rickets have been studied by Mitchell and Nelson (*J. A. M. A.* 95:1896, Dec. 20, '30) in seventy well infants from one to twelve months of age. The infants were divided into slowly, moderately, and rapidly growing groups, and were examined physically and by roentgenograms of the wrists for evidence of rickets at various times. Abnormal bone development was evident in 75% of the infants, and those in the rapidly growing group showed the highest percentage of rickets. These changes occurred in infants, who were generally healthy, consumed an abundance of milk and a teaspoon of cod liver oil daily, who gained in weight from five to ten ounces a week, and whose blood contained from five to seven milligrams of phosphorus to one hundred cubic centimeters. In a more comprehensive study of incidence of rickets in the South, Mitchell (*South. M. J.* 23:228, Mar. '30) found the disease in 49% of five hundred white and 87% of five hundred negro children. Breast milk during infancy appeared to be somewhat protective, and fewer of the last children of the families had the disease, but cod liver oil in small and irregular amounts did not have a very beneficial effect. The pathogenesis of various forms of rickets has been determined by Bloch and Faber (*Acta Paediat.* 10:10, Aug. 18, '30). Of seventy-one patients, six had a low serum phosphorus but normal calcium, fifty-two had a decreased calcium and phosphorus, and thirteen a low calcium but normal phosphorus. The last type is mild and without conspicuous bony deformities. The oral administration of calcium in this type causes a rise of the serum calcium but a lowered phosphorus. In the low phosphorus type if a phosphate is given by mouth the serum phosphorus rises but the calcium becomes abnormally lowered. Accordingly, in clinical rickets it is the retention not the absorption that is at fault, for when antirachitic treatment is instituted, the first change will be a rise in the serum calcium or phosphorus or both; and healing of the bone will occur subsequently. From an exact study of the calcium and phosphorous metabolism during active, early healed, and advanced healed rickets, Macrae (*Arch. Dis. Child.* 4:95, Apr. '29) reports that the calcium balance observed over a period of three weeks is the most reliable criterion of the value of treatment. Roentgenograms during a similar period will give good re-

sults likewise. The newer aspects of the use of viosterol from the treatment of infants have been described by Hess et al (*J. A. M. A.* 94: 1885, June 14, '30). The fat substance usually prevents abnormal bone changes, but in the patients in whom rickets occurred the disease was very mild, and the serum phosphorus was normal. Viosterol is also very rapid and reliable in curing rickets and never produces an abnormally high serum calcium. Agduhr (*Monatschr. f. Kinderh.* 47:97, '30) has continued his experimental studies on the toxic effect of cod liver oil in rats, rabbits, dogs, cats, and calves. With a dose of 0.14 to 5 cc. per kilogram injurious effects were often produced. Evidence of degeneration was found in heart, liver, kidneys, and adrenal glands, fatty infiltration in gastrointestinal tract and liver, hemorrhages and necroses of liver, and disorders in many other parts of the animals.

The metabolism and treatment of osteomalacia have been discussed by Gargill et al (*Arch. Int. Med.* 45:879, June '30), and a very complete record of a patient has been described. This patient had a persistently negative calcium balance. Unrefined and tested cod liver oil had no influence on the patient's condition, but a concentrate containing large amounts of vitamins A and D and ultraviolet irradiation brought about a large deposition of calcium and phosphorus in the bones. The administration of calcium lactate and disodium acid phosphate increased the storage of calcium and phosphorus in the bones. The authors conclude that osteomalacia greatly resembles adult rickets.

A comprehensive report on the problem of dental caries has been issued by Bunting et al (*Am. J. Dis. Child.* 40:536, Sept. '30). As an experimental study three groups of children in homes and schools were given a special diet and hexylresorcinol mouth wash; while two other similar groups, serving as controls, had a general diet. The special diet was composed of wholesome food but fortified by a quart of milk, some green vegetables and fruit for each child daily. Neither cod liver oil nor viosterol was given to any of the children, and candy, sweet stuff, and sugar were greatly limited in the food consumed by those on the special diet. The six hundred and twenty children of all the groups had a careful dental examination before and after a year of the special or general diet. The results obtained were that the teeth of the children on the special diet showed very few cavities, or twenty to twenty-five per cent., while those on the general diet showed fifty per cent. of active caries.

The nutritional factor in arthritis has been considered by Fletcher (*J. Lab. & Clin. Med.* 15:1140, Aug. '30). The author is convinced that disorders of the colon are largely responsible for the cause and development of this disease. The relief of arthritic symptoms by changes of diet, colon irrigations, laxatives, or intestinal antiseptics, or the implantation of acid-forming organisms, evidently acts as a palliative measure in correcting digestive disturbances. The disorders of the colon, such as loss of tone, decrease or absence of haustral markings, and increased length, may be observed by x-ray examinations. The changes of diet bring about the most permanent good; and to this end the amount of food, and especially carbohydrate, is very much limited, but an abundance of the vitamin-containing foods is recommended. Wheat germ, wheat germ extract, or yeast as a source of vitamin B is given liberally.

XI. GOITRE, TUBERCULOSIS, AND CANCER

A survey of the incidence of goitre in Northern Ireland has been made by Olsen and Neal (*Pub. Health Rep.* 45:2669, Oct. 31, '30). They examined four thousand, six hundred and forty-eight male and three thousand, nine hundred and ninety-two female applicants for emigration and classified the thyroid according to the degree of enlargement. The degree found in the males was very slight, or a percentage of 9.4. Of this number the thyroid was small in 1.6%, moderate in 0.3%, and adenomata occurred in 0.4; but in the females the disease was more prevalent as 16.3% had a very slight, 7.1% a slight, 2.5% a moderate, and 0.07% a marked enlargement, and adenomata occurred in 1.4%. In the early twenties the age incidence was the highest in both groups. A comparison between thyroid enlargement and intelligence did not show any relationship.

McCarrison has continued his experimental studies on goitre in rats and has achieved valuable results. In one experiment (*Indian J. M. Research* 18:577, Oct. '30) he has induced the so-called lymph-adenoid goitre in rats with a diet of white bread and dried yeast. The addition of lime to this diet did not increase the number of goitrous animals, but iodine did increase the incidence during the summer and fall months. Vitamin A deficiency appears to be the chief dietetic factor in producing this type of thyroid enlargement. While the study is entirely devoted to changes in the thyroid, it is interesting to note in the tables that the cause of death was ascribed to enteritis, urinary calculus, pneumonia, gastric ulcer, pyonephrosis, cystitis, hepatic abscess, pericarditis, etc. In another comprehensive paper (*Indian J. M. Research* 18:1, Oct. '30) the effects of high protein diets on the thyroid gland of rats are considered. To the basal diet of white flour, olive oil, cod liver oil, dried yeast, and a salt mixture were added, then the flour was replaced by 25, 50, 75, and 100% of meat residue or casein. Some of these diets were then made rich and others poor in the fat soluble vitamin, in some the iodine content was increased, and

in others none was given. The animals consuming the complete food were killed at the end of seven months, but those on a deficient food lived only for three or four months. The results obtained were that the high protein diets caused a diminished thyroid irrespective of the fat or iodine content. The only enlarged glands observed came from animals on a low protein diet and one deficient in vitamin A. The high protein and vitamin A deficient diets frequently caused urinary, respiratory, or gastro-intestinal diseases.

The effect of a predominantly basic diet in the treatment of human tuberculosis has been observed by Mayer & Kugelmass (*J. A. M. A.* 93:1856, Dec. 14, '29). The food included a mineral mixture similar to that employed by Hermannsdorfer. The diet, composed largely of vegetables, amounting to 3,500 large calories, with 92 grams of protein, 378 grams of carbohydrate and 174 grams of fat, was consumed in seven meals. The results obtained with twenty patients with advanced tuberculosis during a trial of six months were that in eight there was a gain in weight, in eight the lungs became less dense, in four the fever was reduced, and in two the symptoms of intestinal tuberculosis disappeared, etc. Wichmann (*Klin. Wchnschr.* 8:2366, Dec. 8, '29) has tried the Gerson-Hermannsdorfer diet on thirteen patients with tuberculosis of the skin. None of the patients improved, three did not change, and one got worse. The food requirements of children with tuberculosis of the bone have been studied by Petermann and Hug (*Am. J. Dis. Child.* 40:305, Aug. '30). The children were given good wholesome food as a basic diet and had supplementary feedings of whole milk, malted milk, vitavose and yeast for three or four weeks at a time. The outcome was that vitavose and yeast did not have an effect on the appetite but half of the children gained consistently with milk. The conclusions were that the food requirements of these children with chronic disease were not high, but should exceed by 50% the basal requirements for "normal" children. The treatment of open pulmonary tuberculosis with vitamin D is recommended by Menschel (*München. med. Wchnschr.* 77:329, Feb. 7, '30), for with viosterol the exudative process is checked, connective tissue forms, the fever is reduced, night sweats disappear, and the patient's weight increases. Small doses, not more than five or ten drops in oil 100D should be given, and the effect of the viosterol becomes apparent in five or six months. It does not have an effect on the anemia, for which arsenic or liver therapy should be used. The addition of cod liver oil and phosphorus to the Gerson-Hermannsdorfer diet for tuberculosis is a very essential requirement of the treatment, according to Gerson (*Deutsche med. Wchnschr.* 56:478, Mar. 21, '30).

In a critical study of vitamin A and carcinogenesis in rats, Sugiura and Benedict (*J. Cancer Research* 14:306, June '30) have not found that cancer developed in animals with this deficiency. Of one hundred and eight rats on the diet for eighteen months, only two tumors were found, and these were an adenocarcinoma and an adenofibroma of the mammary gland. Portions of the stomach in some animals showed a keratinization of the epithelium. In another investigation these authors (*J. Cancer Research* 14:311, June '30) report on the influence of high fat diets on the growth of carcinomata and sarcomata in rats. In one series the Flexner-Jobling rat carcinoma was inoculated into animals on 40%, 20%, 10% fat, fatless, and normal diets; and in another series the Sugiura rat sarcoma was inoculated into animals on similar diets. They found that the percentage of positive tumor inoculations and the rate growth of the carcinoma were diminished, and the number of tumor regressions was increased by feeding rats with an excessive amount of butter fat. The sarcoma was not accelerated or inhibited by the diet. The rate of growth of both tumors was not affected by the fat-free diet. Therefore vitamins A, C, D, and E are not essential for the growth of these tumors.

POSTURE STUDIES

The Public Health Service has recently issued a further bulletin on the subject of physical development and posture. (Public Health Bulletin No. 179.) In this investigation 2,200 boys and men were given careful physical examinations and three photographs, profile, front, and back were taken of each person, nude. In addition to summarizing such definitely quantitative information as was obtained with regard to postural relations, the bulletin presents a series of profile photographs chosen at random, representing individuals of all ages from 2½ years to more than 60 years.

The point of view of the report is that of determining how people stand, rather than what constitutes "good" and "bad" posture. Rigorous standards of an objective and quantitative character were required for each step of the investigation. The discussion and conclusions have been confined to a description of relations actually found in the course of the investigation, with the few inferences which it appeared could be logically drawn.

The primary characteristic of all the postural relations studied was that of variability; and this variability was particularly manifest in the presence of widely different postural characteristics in the same individual. No fixed types of posture could be found, even among the youngest children.

The specific conclusions of the investigation are technical in nature and cannot be given in a brief summary. They are of a decidedly negative character and do not lend support to certain more or less established ideas. At every point in the investigation an unmistakable impression was obtained of the great variability in postural relations from person to person and the impracticability of establishing specific standards of posture.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 17331

CHRONIC PULMONARY INFECTION WITH SEQUESTRATION OF AN ENTIRE LUNG

SURGICAL DEPARTMENT

PRESENTATION OF CASE

DR. EDWARD D. CHURCHILL: This is the story of a seven year old girl who had a tonsillectomy with adenoidectomy in August 1929. Following this she was perfectly well until the onset of her present illness, which seems to date from an attack of measles in March 1930, just a year before admission to this hospital. This was described as a very mild illness and she was kept in bed for three weeks. During the second week she developed a cold with a dry and unproductive cough as the chief symptom. This bothered her chiefly at night, waking her quite frequently with attacks of coughing. At this time the parents did not notice an odor to her breath. Three weeks after the onset of the measles she got out of bed, went to school and played with other children. She was quite well except for the cough.

Five weeks from the onset of the measles she was taken to the family doctor. About this time the cough increased and she began raising considerable quantities of thin yellowish sputum, described as phlegm. This was without odor and never blood tinged, but of sufficient quantity to require the use of two to three handkerchiefs at a time. The child then began to lose her energy. She moped about and did not care to play. Her appetite remained fair. This state of affairs went on until June 1930.

In June she began to complain of some pain, putting her hand on her left upper chest. This came usually after an attack of coughing. During the summer her mother noticed that the child was listless. She took her to the beach, but she ate poorly and would not play. During July and August the cough and sputum persisted as before except that on one occasion there was slight streaking with blood.

In September she was taken to a hospital for x-ray examination. The doctors there told the mother that the child had "pus between the ribs" and urged her to send the child into the hospital. Because of financial difficulties she did not follow this advice and the same story continued during the fall. The child then began to vomit after attacks of severe coughing.

In January she was taken to the hospital again. At that time the mother began to notice a foul odor to her breath and foul sputum. It was quite evident that the child was losing weight.

I saw her in that hospital. They had tapped the chest but did not get any pus. In one place a little clear fluid was obtained. On one occasion during her stay in the hospital the child raised almost a pus-basinful of very foul sputum. She was kept on postural drainage and continued to raise sputum which was now quite foul.

In March the child was transferred to the Massachusetts General Hospital. At this time she was coughing and raising small amounts of foul sputum. She was very emaciated, with long eyelashes and a waxy complexion. There was marked clubbing of the fingers and toes. Examination of the chest showed the expansion very much limited on the entire right side. The right chest was absolutely flat to percussion. The voice sounds and the tactile fremitus were markedly diminished on that side. The left lung was clear and hyperresonant. She had a hemoglobin of 35 to 45 per cent, a red blood cell count of 4,340,000 and a leukocytosis of 34,000.

The first impression was that the child had an empyema. There were however some very atypical findings. First of all was the very foul sputum, suggesting intrapulmonary pathology rather than empyema. The fact that the heart and trachea were not displaced also seemed very much against the presence of a chest full of pus. As a diagnostic measure we planned to inject lipiodol at the time of the chest tap. The needle was inserted in the right axilla and 20 cubic centimeters of thick foul pus resembling the sputum was obtained. I mention this diagnostic procedure with a word of caution, because due care must be exercised to avoid getting the needle into a branch of the pulmonary vein. A cerebral embolus of lipiodol would be disastrous. Following injection the lipiodol ran into the base of what apparently was the lung. By x-ray we see it working its way up through the trachea. This shows better perhaps in the lateral x-ray than it does in the anteroposterior view. It shows very definitely that the pus we obtained either was from the lung or there was a communication between an empyema and the lung—a very large bronchial fistula. The shadow cast by the lipiodol was very suggestive of bronchiectasis with a large club-like formation in the bronchi.

The child continued to run an elevated temperature with a high pulse. Later she was temporarily transferred to the Eye and Ear Infirmary for lipiodol injection through the trachea, but so much pus welled up that no lipiodol went down and the attempt was not successful. As the child's pulse was rapid and her temperature high, she was obviously in no condition for

radical procedure and nothing further was done. Her death was quite sudden and seemed to be associated with an intrapulmonary hemorrhage.

Clinical Discussion

Dr. George W. Holmes: The interesting thing in the x-rays is the extreme dullness, which in the absence of displacement of the heart has the characteristic appearance of fluid. We could get that picture if the lung were collapsed or destroyed under a collection of fluid. We should suspect that pus was draining in the pleural space. She might have a lung abscess which had ruptured into the pleural space and also into the bronchus. I do not believe that the patient had a completely destroyed lung. Without fluid in the pleural space bronchiectasis alone could not produce this appearance. If it were a destroyed lung and the process were entirely in the lung the heart should be displaced more than it is. The heart is apparently normal in position. I should think there must be fluid in the pleural space.

Dr. Maurice Fremont-Smith: If there were much fluid in the pleural space and the abscess were not a small one walled off by adhesions, wouldn't you expect the lipiodol to diffuse through the pleural space rather than appear in the bronchus? Wouldn't you rather infer that you had here a lung abscess with a little bronchial fistula and a rather small empyema outside?

Dr. Holmes: Of course that reasoning is very good. Still it is possible for the needle to pass through an area of fluid in the pleural space into the lung.

Dr. Churchill: I obtained pus and put in the lipiodol with the needle quite deep. It penetrated a dense wall of scar tissue.

Dr. Edward L. Voke: Don't you think the interspaces would give you some lead as to the amount of fluid?

Dr. Churchill: You mean that the contour of that right side indicates empyema?

Dr. Voke: That it does not indicate empyema.

Dr. Holmes: Usually when fluid does accumulate in a child's chest it spreads as an even blanket over the whole lung. There might not be any particular area of great depth.

Dr. Frederick T. Lord: Were these x-rays taken lying down or sitting up?

Dr. Churchill: These were taken sitting up.

A Physician: How soon after the lipiodol injection?

Dr. Churchill: Immediately.

Dr. Lord: You did not give us all the physical findings, did you? Was the breathing bronchial, with râles?

Dr. Churchill: The voice sounds and the tactile fremitus were absent. The right chest was perfectly flat, with limited expansion and no râles.

Clinical Diagnosis (from hospital record)

Lung abscess.

Anatomic Diagnoses

Abscess of the right lung.
Fibrinous pericarditis with perforation.

Pathologic Discussion

Dr. Tracy B. Mallory: We found at autopsy a lung abscess which was, considering the size of the child, a huge one. This is the affected lung. (See illustration.) The pleural space is completely obliterated. The persisting rim of pulmonary tissue together with the pleura measures only from half a centimeter to two centimeters in thickness. The entire central portion of the lung is replaced by a huge abscess cavity which involves both lobes. At one point only is there a narrow ridge of tissue to mark the location of the interlobar septum. The bronchi enter the abscess less than a centimeter away from the bifurcation. The pulmonary artery runs along the side of the abscess cavity, but there does not seem to be any perforation of its major branches. On the other hand several of the smaller vessels show fresh thrombi, and one of these smaller branches was undoubtedly eroded to produce the fatal hemoptysis. At two points the abscess had actually dissected through the thickened pleura and had perforated the pericardium and partially eroded through the diaphragm.

Having seen the specimen, Dr. Churchill, do you think there was anything that could have been done?

Dr. Churchill: Of course temporary improvement could have been obtained merely with drainage; but it was the most widespread destruction of the lung that I have ever seen. All three lobes were fused into that one enormous cavity. The infection in one place had gone through the diaphragm and there was a fibrinous exudate on the surface of the liver. I think it was a hopeless condition.

What puzzles me is to explain such widespread destruction of lung tissue with such an insidious onset and low-grade sepsis. We see extensive destruction of the lung with gangrenous abscesses, but usually with a chronic, slowly progressing process we see scar tissue deposition and localized multiple abscesses with bronchiectasis.

I should like to ask Dr. Mallory if he can explain the formation of this enormous cavity with that type of sepsis.

Dr. Mallory: No.

Dr. Churchill: I wonder whether it might not have been due to congenital cystic disease of the lung or one of the rare anatomic anomalies. There was complete breaking down of both lobes and fusion into one cavity. The

pleural cavity was obliterated. Don't you think that is a possible explanation, Dr. Lord?

DR. LORD: Yes.

DR. WILLIAM B. BREED: Was there no free fluid in the pleural cavity?

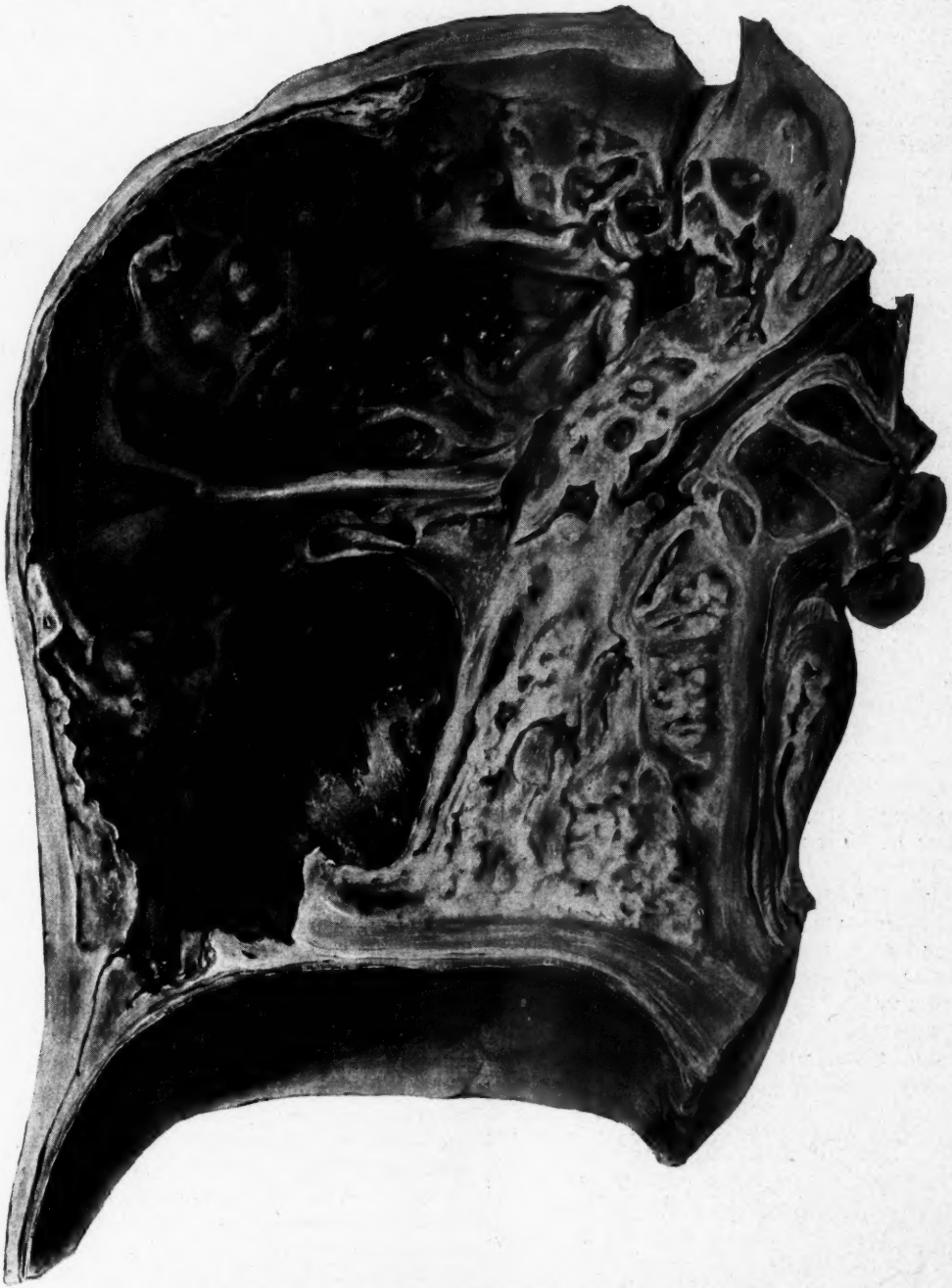
DR. CHURCHILL: No. It was obliterated by adhesions.

DR. HOLMES: Was the abscess cavity filled with fluid?

DR. MALLORY: It contained semisolid necrotic and purulent débris.

DR. HOLMES: That explains the appearance of the lung in the x-ray. How do you explain the appearance of the lipiodol shadow?

DR. CHURCHILL: It trickled down into some of the honeycomb-like trabeculations of the cavity.



CASE 17331. Gross appearance of the right lung in frontal section. The entire lobar septum is broken down and the lung substance almost completely excavated.

After a drawing by Miss Muriel McLatchie.

A PHYSICIAN: Why was there no fluid level? Had she drained all the pus?

DR. CHURCHILL: I do not think she had drained any, so there was no air above it.

A PHYSICIAN: Wasn't there any suspicion of lung abscess?

DR. CHURCHILL: Yes, that was our diagnosis.

A PHYSICIAN: Why didn't they let her drain?

DR. CHURCHILL: We turned her upside down every day twice a day and she raised only about half a teaspoonful of pus.

DR. LORD: We have had a small group of patients in the Thoracic Clinic with pulmonary abscess and no evidence of cavity by x-ray. I recall the recent case of a woman of thirty with cough and foul sputum for about five months following the removal of tonsils and adenoids. Anteroposterior and lateral x-rays showed an area of homogeneous density behind the heart shadow. Repeated attempts failed to show fluid level. Lipiodol by bronchoscopic insufflation failed to enter the involved area, which appeared as a blank. Surgical exploration showed a thick pleura and an abscess cavity containing thick pus within the left lower lobe. In a second recent case, a boy of eleven, there was a history of an illness of about two months, with cough and scanty sputum without foul odor, fever, leukocytosis and signs suggesting encapsulated fluid in the left upper front of the chest. Repeated x-ray examination showed homogeneous density between the second and fifth ribs. No fluid level could be demonstrated. Operation showed lung abscess.

DR. HOLMES: I think that might happen. But I have never seen anything like this.

DR. ALLEN G. BRAILEY: Isn't the x-ray rather strange? Was there not enough scar tissue to pull the heart towards the affected side?

DR. CHURCHILL: The lung certainly appeared small.

DR. HOLMES: Was the heart enlarged at all?

DR. MALLORY: No.

DR. JOHN P. MONKS: Is it not possible that at only one time to our knowledge was the cavity anywhere nearly drained of pus, that being when she is reported to have raised a whole basinful, and at that time the heart was pushed over towards the affected side? At the time when this x-ray was taken the affected side was, as was discovered at autopsy, filled with pus under tension, which prevented the displacement of the heart to this side.

DR. CHURCHILL: She had a perfectly rigid mediastinum from the obliterative pleurisy.

I think parallel cases are always of interest. I wish to mention the case of a boy eight years of age who for six months has had non-productive cough, loss of weight, some dyspnea on exertion and some pain in the right axilla. He was referred here as having an encapsulated empyema. He has clubbing of the fingers and long eyelashes. His general appearance is very like that of the little girl. He has quite a marked secondary anemia. When he is turned upside down he raises about two drams of very foul sputum which smells much like that of the little girl. X-rays show complete opacity of the right upper chest with no displacement of the heart and trachea and the same type of interspaces. Again a chest tap in this region yielded foul pus. At surgical exploration we opened into an enormous cavity containing many large bronchial fistulas, apparently a complete excavation of the right upper lobe. The interior of his cavity felt as this specimen might if you explored the inside with your finger. It is a very similar case, except that the process is localized to the right upper lobe.

DR. BREED: Will you do anything more to him in the way of treatment later on?

DR. CHURCHILL: I think we shall have to produce some sort of surgical collapse when he is in better condition.

I cannot quite get away from the idea that there is an underlying anatomic anomaly here such as a congenital cyst.

CASE 17332

COUGH OF ONE AND A HALF YEARS' DURATION

SURGICAL DEPARTMENT

PRESENTATION OF CASE

DR. CHARLES P. SHELDON*: This is the case of a thirty-three year old married shipper who entered the hospital March 7 complaining of cough of one and one half years' duration and foul sputum of six months' duration.

Seventeen years before entry the patient had double pneumonia. He was in bed for two or three months and had a right empyema drained. After this he had quite a complete recovery and was symptom free until five years before admission, when he had a second attack of pneumonia, followed by two more attacks during the next two years. Each time he was in bed six to seven weeks with malaise, fatigue, chills, pain in the left chest and cough. Recovery from the third attack was slow and a non-productive cough continued, although he returned to work and was otherwise quite well. Two years before entry the cough grew worse and he noted easy fatigue. Six months later he began to cough up considerable whitish sputum. Since that time he had had frequent colds accompanied by exacerbation of sputum. Six months previous to his admission he first noted foul breath and very foul sputum. He had had occasional night sweats but no weight loss.

The family history and marital history are negative.

The past history is negative.

On physical examination he was a well developed and nourished man. His fingers, nails and lips were slightly cyanotic. His breath was foul. The heart was displaced to the left and upward. The apical impulse and left border of dullness were in the fourth space 10 to 10.5

*Junior interne on the East Surgical service.

centimeters to the left of the midsternal line. There was dullness over the left lung in front, and over the entire left lung increased tactile fremitus and whispered voice with areas of cavernous breathing and loud coarse râles. There was a scar of an old rib resection over the left base with some surrounding dullness but no râles. There was classical clubbing of the fingers and toes.

The red blood cell count was 4,000,000, the hemoglobin 81 per cent, the white cell count 7,000. A smear showed slight secondary anemia. The sputum was negative for spirochetes and tubercle bacilli. A Hinton test was negative.

On March 10 x-ray examination showed the entire left lung abnormal. The report was: "There are round areas of rarefaction varying in size from one to three centimeters scattered from the apex to the base. Some of these have horizontal lower margins probably representing fluid level within cavities. The heart and mediastinum are considerably displaced to the left. The left side of the diaphragm is high and its excursion limited. The right lung is normal." The findings were interpreted as those of an obstructive process with cavitation involving the entire left lung, probably representing multiple lung abscesses.

On March 12 one of the upper cavities was aspirated under the fluoroscope and a lipiodol injection was given. A direct smear from the fluid from the cavity showed fusiform bacilli and a few spirochetes. X-ray showed a shifting fluid level outlined by the lipiodol at about the center of the lung field in the region of the interlobar pleura. The cavities along the left axillary border had changed in shape and appeared to be connected by air. On the sixteenth, four days after the injection of lipiodol, x-ray revealed it in two main places, one at the base of the upper lobe and one in the lower lobe.

Operation was advised and the patient was transferred to the East Surgical service. It was found that he had some cellulitis at the site of the injection. The temperature had gone up to 100.6° by mouth. In spite of this, operation was thought advisable on the twenty-second of March.

On March 24 he had a rib resection under gas-oxygen, with incision and drainage of the lung abscess and the cellulitis of the chest wall. Drains were introduced into each of two of the large cavities. There was no foul odor; this was thought possibly to be due to the lipiodol injection which he had had ten days before operation.

On March 29, five days after operation, the wound was draining well, but he complained of severe headache and was not happy in the ward. On April 2 he started to vomit and the headache persisted. A lumbar puncture was done. The initial pressure was 260 millimeters. The fluid was slightly ground glass in appearance. The oscillations and dynamics were normal. There were 1,200 cells, 90 per cent lymphocytes and 10 per cent polynuclears. The total protein was 58. The sugar was 48.7. The white blood cell count that day was 8,000.

Examination of the eyegrounds revealed 2½ to 3 diopters choking of the right disc, about 2 diopters choking on the left. On April 3 the only localizing sign was reduplicated ankle jerk on the left. The right disc was still more choked than the left, about as on the previous day. It was thought that he had probably developed a brain abscess and had a low grade meningitis.

On April 4 another lumbar puncture revealed the initial pressure 330 milligrams, 1,851 cells. The fluid showed no growth bacteriologically. The chlorides were 614, the sugar 22.5, the total protein now 210, the colloidal gold 4455544433. The fluid was more cloudy than at the previous tap.

Clinically however the condition was unchanged except that he had less headache. We noted stiffness of the neck. He still had reduplication of the left ankle jerk. There was a questionable Kernig. It was thought that he probably had brain abscess and trephine was advised. The site of the abscess was not certain but it was thought to be in the frontal region.

That day, April 4, he had trephine and cerebral exploration for brain abscess under colonic avertin anesthesia. That evening he had not gained consciousness and his breathing was labored. He was aspirated hourly. The next day he was conscious but irrational. The pulse and temperature rose steadily.

Another lumbar puncture was done on the seventh. At that point he was moribund. The initial pressure was 350 milligrams. The fluid was cloudy and xanthochromic. There was no evidence of block. About 20 cubic centimeters of fluid was removed. The temperature rose to 107.3°, the pulse to 140, the respirations to 50. He died the next day.

Clinical Discussion

Dr. Henry R. Viets: The question of brain abscess following pulmonary abscess is one of great interest to us. In this case we felt because of the markedly choked discs and the headache five days after the pulmonary operation that he had, as early as that time, increased intracranial pressure and quite probably abscess or abscesses. The lumbar puncture helped in the diagnosis, as the pressure was increased and there was marked increase in the number of cells in the spinal fluid. We tried to localize a single abscess but failed to do so definitely, as the only leading neurological sign which would help us was reduplication of the ankle jerk on the left side. My feeling was that it was more likely that he had multiple brain abscesses than single brain abscess, and that operation was, therefore, not indicated. That was only a personal opin-

ion, because other members of the Neurological Department, in going over the case, felt that operation was indicated and entirely justified in spite of the fact that the man was obviously very seriously sick. My reasons for saying that operation was not indicated were largely on the basis first, that I had no real lead as to where the main abscess was, and second, that brain abscess following lung abscess is extremely likely to be multiple and not solitary. Operation is likely therefore to be of no avail.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Multiple lung abscesses.
Brain abscess.
Meningitis?

ANATOMIC DIAGNOSES

Multiple abscesses of left lung.
Multiple abscesses of brain.
Terminal pneumonia, right lung.

Pathologic Discussion

Dr. Tracy B. Mallory: The autopsy showed the usual findings in a case of this sort with slow onset in that there were multiple abscesses all through the left lung and, as Dr. Viets predicted, also multiple abscesses in the brain. In a case of this type it is often rather hard to decide whether it starts as bronchiectasis or as lung abscess. In many of these cavities quite definite bronchial epithelium is left. In some it has disappeared and the cavity is lined with granulation tissue. Whether there was an original abscess there and bronchiectasis secondary to that was I think practically impossible to say at the time of autopsy. A sufficient length of time had elapsed so that very diffuse sclerosis of the entire lung had occurred and on that side there was no functioning lung tissue whatever left. He had evidence of a terminal pneumonia in the other lung, a very common thing in these cases. The brain abscesses were small, averaging under a centimeter in diameter. There was one in the cerebellum, one in the frontal lobe, one in the temporal lobe, still another in the cortex in the pyramidal region.

I should rather think the prognosis in these cases depends more on the multiplicity of the lesions than on anything else. That is, one's chance for doing anything for cases in which the lesions are multiple is very slight.

Dr. Edward D. Churchill: Yes. I think probably the plan was to drain the largest abscesses and then to collapse the rest of the lung by rib resection.

Dr. Mallory: Always in these cases one finds very extensive involvement of both arteries and veins on the edges of the abscess cavities. We invariably find a great many completely obliterated blood vessels around the pulmonary lesions. We quite often find fairly recent thrombi as yet incompletely organized. It is quite possible for one of these to break loose and become an embolus, which for some unknown reason appears to be particularly apt to go to the head.

Dr. George W. Holmes: There is an interesting observation on these films that I might point out. In the lateral view anatomically this area should be the lower lobe and this the upper lobe. As we look at the film it seems to be bright in front, as though the upper lobe were not involved and the process were confined to the lower lobe. One might interpret it as a process in the lower lobe with some collapse of the left lung. Yet at the autopsy the whole lung is completely destroyed. The only way I can explain this appearance is that the right side of the chest is retracted to such an extent that the left lung covers it completely, so that we see only this lung in the lateral view. I think the point is of some importance, because it is possible that such a film might be very misleading, particularly if one were considering surgery.

The New England
Journal of Medicine

SUCCESSOR TO
THE BOSTON MEDICAL AND SURGICAL JOURNAL

Established in 1828

Published by THE MASSACHUSETTS MEDICAL SOCIETY under the jurisdiction of the

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Material for early publication should be received not later than noon on Saturday. Orders for reprints must be sent to the Journal office, 165 Newbury Street.

The Journal does not hold itself responsible for statements made by any contributor.

Communications should be addressed to The New England Journal of Medicine, 165 Newbury Street, Boston, Mass.

AGAIN—SEPTIC SORE THROAT

OUR readers may remember that in 1929 there appeared in this journal three articles giving the history of septic sore throat, and describing in full detail the clinical picture of the disease, as well as the circumstances of the epidemic that occurred in western Massachusetts in the early summer of 1928. In the many epidemics reviewed the facts disclosed were essentially the same. The first cases in these outbreaks—and sometimes there were many of them—were incorrectly diagnosed, while a large number of later cases were frequently unreported; those stricken had partaken of milk in one form or another, and usually had been supplied with milk from a single dealer; the source of the infection, often discovered after much delay, was usually found to be a cow suffering from an infection of the udder, and this infection of the cow was, as a rule, due to a hemolytic streptococcus similar biologically to the hemolytic streptococci present in the throats and other foci of infection of the patients; the milk was nearly always raw milk or milk improperly pasteurized; the communities in which the epidemics took place generally had permitted the sale of raw milk and then, as a result of their dire experience, had later passed ordinances requiring that all milk sold should thereafter be pasteurized. The door of the stable, as is so often the case in other human affairs, was locked too late to prevent that particular round of human suffering and death.

In the articles referred to, the description of the early and subsequent symptoms of septic sore throat was so complete as to make the diagnosis of suspected cases of septic sore throat an easy one; the evidence showing the direct connection between the cases and the milk was most convincing; the case for the comparative safety of pasteurized milk was thoroughly proved, and the plea for universal pasteurization was an earnest and wholly reasonable one.

With all these facts as common knowledge, it would seem that subsequent epidemics of this disease would cause serious reflections upon physicians, health officers and city and town officials. Yet the same sorry story is repeated again and again. There continue to be reports of epidemics of septic sore throat in this country and in Canada with their tale of delayed diagnosis, delayed discovery of the source of infection, and delayed passing of pasteurization ordinances.

Within the past few months the town of Walton in New York State, to mention only one instance, has passed through the unhappy experience of such an epidemic. Here again early cases occurring in February and March were undiagnosed; the outbreak began on March twenty-fourth and reached its peak on April seventh and other cases developed until May nineteenth. Of four hundred and forty cases, only one hundred and twelve were reported by physicians, the remainder being discovered by the epidemiologist investigating the outbreak. The great majority of those infected were supplied with milk by the same dealer, and on a dairy farm supplying this dealer there was a cow suffering from an udder infection apparently caused by the same type of hemolytic streptococcus as that isolated from cultures taken from the patients. Then to make the story complete to its last detail, the village board on May eighteenth amended the village sanitary code and prohibited the sale of raw milk in the village.

We realize that there is an inevitable lag in the utilization of medical knowledge in the safeguarding of human life, but in the case of septic sore throat our knowledge is so complete that we should no longer tolerate conditions that make its visitation again possible. To this end we urge a rereading of the articles quoted and

livelier interest in measures for safeguarding our milk supplies.

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SOME CITIES AND SOMERVILLE

In a recent number of the Journal of the American Medical Association*, Somerville is given the unenviable—not to say shocking—distinction of leading all the cities of the United States in its mortality from diphtheria. Its rate of 26.9 (that is, the number of deaths for every one hundred thousand of population) would not have been an unusual or shameful record fifteen years ago before the adoption of toxin-antitoxin mixture for the prevention of diphtheria, but this record is for the year of Our Lord 1930! Furthermore, Somerville is in the Commonwealth of Massachusetts, where diphtheria toxin-antitoxin mixture is supplied free of charge by the State Department of Health. Of all the cities in Massachusetts only one other, Lynn, exceeded a rate of 10 (actually 10.7), and Lynn, therefore, is awarded second place on the list, while New Bedford's rate of 8.0, Springfield's 5.3, Lowell's 4.0, Fall River's 3.5, Boston's 2.9, Worcester's 1.5 and Cambridge's 0.9, stand out in striking and happy contrast to Somerville's 26.9. Somerville's diphtheria death record for 1930 was practically the same as in the period 1905 to 1924. So far as diphtheria is concerned Somerville has stood still. There were 179 cases and 26 deaths of which 23 occurred in children 10 years of age or under. To be sure, two of these deaths were of non-residents, but they do not affect the seriousness of the situation because Somerville's lead over all other cities is far too great to be affected by a change of 1.9 in the total mortality rate.

These Massachusetts cities and cities throughout the country believe in, recommend and practice active immunization of their child inhabitants against diphtheria—Somerville does not. Not only have its health officers and local medical society failed to carry on any diphtheria prevention program, but the health board so far has declined to comply with the order of the mayor that they provide and urge the utilization of facilities for diphtheria prevention.

Mayor Murphy of Somerville, with the good of his people in mind, last autumn called in experts to survey various conditions in the city and to report to him the city's needs. The authority who made the sanitary survey reported, among other things, that the Board of Health failed to provide facilities for the vaccination of children against smallpox and for the immunization of children against diphtheria, although an excellent opportunity to provide this service is furnished through the infant welfare clinics. In the public press, it was announced that the Mayor had ordered the Board of Health to make plans for a city-wide campaign for the use of toxin-antitoxin as a preventive of diphtheria and that provision was to be made in the budget for whatever expense might be necessary in order to do the work promptly and efficiently. The Mayor, with a most praiseworthy public spirit, offered to present his six-year old daughter as the first child to be immunized with toxin-antitoxin. That was in January—this is August, and so far as we have been able to learn, the Mayor's order has not been obeyed,—certainly the word "promptly" has been disregarded.

So far in the first six months of this year Somerville's disgraceful record has continued to be one that reflects no credit upon the local health authorities or the local members of the medical profession. To be sure, for the first seven months of the year there were seventy-two cases of diphtheria reported against one hundred and five last year. When, however, one compares Somerville's rate with the rate of a town such as Brookline that believes in and practices diphtheria immunization on a community wide basis, one realizes the cost of indifference in human suffering. Brookline has a rate for the first seven months of 0.15—while Somerville's rate was 7.0! Brookline prevents diphtheria—Somerville treats it. We wonder if, in view of the fact that Somerville led the cities of the Nation in its diphtheria rate, the slogan recently adopted by its business men—"Somerville, the Heart of New England"—would not be more accurately descriptive if an anatomic organ situated higher up in the human economy were substituted and the geographic area extended to include the United States.

*Vol. 96, No. 21, page 1768, May 23, 1931.

THE ARGYLL-ROBERTSON PUPIL

Of all the signs of disease none has been considered, in the past, as more suggestive of a structural lesion than the Argyll-Robertson pupil. Although not necessarily indicating an active stage, it has become a sign of great value in cases of syphilis of the central nervous system, the finding of which practically guarantees the diagnosis. The sign is found not only in tabes dorsalis and general paresis but in all, or any, of the various forms of syphilitic infection of the nervous system. So sure has the medical profession been in the past, in regard to the value of this sign, that it has been used as an argument in medico-legal cases for almost certain evidence of syphilis.

There is a growing feeling among neurolo-

gists, however, that the sign is not always pathognomonic of luetic infection. This idea has especially been entertained since the advent, about a dozen years ago, of another disease of the nervous system, encephalitis lethargica. In this disease the pupils are also often affected; in most cases, moreover, with other parts of the nervous system, especially the part of the third cranial nerve supplying the extra-ocular muscles. A number of patients have been carefully examined over a period of years, with a pupillary reaction very similar to, if not identical with, the Argyll-Robertson pupils, on whom it did not seem justifiable to make a diagnosis of neurosyphilis. Some of these patients, observed in 1927 by two English neurologists, were reported as aborted cases of encephalitis lethargica[1]. In their patients, in addition to the Argyll-Robertson pupil, there was absence of knee jerks, which served only to complicate the picture. Formerly, patients with pupils not responding to light and responding well to accommodation and with absent knee jerks, similar to those reported by Morgan and Symonds, were considered as showing the signs of a burnt-out tabes dorsalis, the infection having been overcome by the patient without treatment.

More recently, the whole subject has been reviewed again and six more cases reported[2]. Although each patient had an Argyll-Robertson pupil, slight differences were noted in the reaction to light which served to make the diagnosis of neurosyphilis uncertain. "The true Argyll-Robertson pupil," says Adie, "reacts promptly and fully, often excessively, on convergence, and dilates again as soon as the effort to converge the visual axes is relaxed. In these cases the pupils show the so-called myotonic reaction; they do not respond to light; they contract very slowly through a wide range during a sustained effort to converge; often remain small long after the effort ends and, when they dilate again, do so slowly." This myotonic reaction should be distinguished from the true Argyll-Robertson pupil. Unless the pupils are examined, however, with the greatest possible care, the reaction is likely to be mistaken and a diagnosis of syphilis made. Similar cases have also been reported by Moore[3].

It should be pointed out, therefore, that there is a condition of the pupil very similar to the Argyll-Robertson pupil, which occurs in diseases other than syphilis of the nervous system. In this condition, although the pupil does not react to light and does react to convergence or accommodation, the reaction to the latter states is slow and at times uncertain and does not have the characteristics of the quickly reacting pupil of the Argyll-Robertson type. These statements must not, of course, take away from the value of one of the most important tests in all clinical medicine. The exceptions are so rare that it is safe to consider a true Argyll-Robertson pupil as due to syphilis until, by other means, proved otherwise.

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2 Adie, W. J.: Pseudo-Argyll Robertson pupils with absent tendon reflexes. Brit. M. J. 1:928, May 30, 1931.
3 Moore, R. F.: Discussion on the physiology and pathology of the pupil reaction. Tr. Ophth. Soc. U. Kingdom 44:38, 1924.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

LAHEY, FRANK H. M.D. Harvard University Medical School 1904. F.A.C.S. Director, Lahey Clinic. His subject is: "The Management of Peptic Ulcer." Page 321. Address: 605 Commonwealth Avenue, Boston.

PATEK, ARTHUR. M.D. Harvard University Medical School 1930. Interne, Lakeside Hospital, Cleveland, Ohio. Address: Lakeside Hospital, Cleveland, Ohio. Associated with him is:

WEISS, SOMA. A.B., M.D. Cornell University 1923. Assistant Professor of Medicine, Harvard Medical School. Assistant Director, Thorndike Memorial Laboratory, Boston City Hospital. Address: Boston City Hospital, Boston. Their subject is: "The Tonus of the Autonomic Nervous System in Arterial Hypertension." Page 330.

WORCESTER, ALFRED. A.B., A.M., Sc.D., M.D. Harvard University Medical School 1883. Professor of Hygiene, Harvard University. His subject is: "Modern Nursing." Page 334. Address: 314 Bacon Street, Waltham, Mass.

BURNETT, FRANCIS LOWELL. S.B., M.D. Harvard University Medical School 1906. Investigator of Nutrition and Skin Diseases, Massachusetts General Hospital. Graduate Assistant and Investigator of Nutrition and Arthritis, Peter Bent Brigham Hospital. His subject is: "The Progress of Nutrition." Page 337. Address: 205 Beacon Street, Boston.

MISCELLANY

A BROADCASTING MESSAGE PREPARED AND SPONSORED BY THE COMMITTEE ON PUBLIC EDUCATION OF THE MASSACHUSETTS MEDICAL SOCIETY FOR THE DEPARTMENT OF PUBLIC HEALTH

HEALTH IN INDUSTRY*

"Health is the indispensable foundation of the satisfactions of life; everything of domestic joy and occupational success must be built upon bodily wholesomeness and vitality." These words attributed to Mr. Charles W. Eliot bespeak a depth of

*Broadcast May 6, 1931.

understanding. They do not quite picture health as we may some time see it, boldly drawn in the practical business characters of our time—a picture of Health as Business, in the same vividness which has made us see Health as Religion among the ancient Hebrews, and Health as Physical Strength and Beauty among the ancient Greeks.

Healthy bodies and healthy minds top the list on the housekeeping account of well-managed business. The essential principles of health are the same within industry or without; and today we have only to use eyes and ears and brains to learn the best that is known about the care of personal health. Women are our natural housekeepers; but somehow few women have been deeply interested in health as a matter of business. It is a fact that women in business lose relatively about twice as much sick time as men; but perhaps women in business are less concerned about the assets and liabilities of health because they expect business to be a temporary matter, or an aside from the more important interests of life. Perhaps not every woman knows about the wife of the British Chancellor whose watchful care of her husband's handicapped health has had such an important part in his clear thinking and courageous judgment which have influenced the finance of the world. Whatever the cause, few women have learned that intelligent care of health can influence the very pattern of individuality which determines whether life shall be dull or bright and intensely interesting and profitable.

Our earlier industrial laws were designed to protect the general health and welfare of children and women workers. Among the more recent are our workmen's compensation laws which tax business management with the care and prevention of injuries and sickness caused by occupation. About eighteen years ago our first state workmen's compensation law became effective in Massachusetts. Now all our states save four have such laws. Today in the better organized industries the worker is probably safer from accidental injury or disease at his work than while subject to the hazards of community life outside his work. Single items of community danger, such as home accidents, may equal or exceed the total industrial hazard.

Is this luxury of relative safety at work costing the workers nothing? One day when I had seen little of business medicine a young girl came to my office and dropped limply into a chair with: "Gee, Doctor, I feel just like an accident going somewhere to happen." I'm afraid I assumed she was only an irresponsible child trying to be smart. Now I know that her complaint was a modern description of a peculiar kind of poor health well known to industry. Today safety programs recognize that in most people at some times and some people at all times poor health constitutes a special liability to accident. Good management requires that any worker with a serious handicap of this kind be relieved from exposure to hazard, either by transfer to another job, or, as a last resort, by removal as a "liability" to the business. No doubt many of these "liabilities" thus excluded from industry remain still "liabilities" among the unemployed.

We do not know the frequency of loss of job because of poor health; but we do know that not only gross sickness, but also fatigue, ill temper, sulkiness, carelessness, and other quirks of personality reduce the chances of getting and holding jobs. Figures of the United States Census Bureau seem to show that the chances of an individual seeking a job in the manufacturing industries in 1927 were about 20% less than in 1920. At present the facts are less encouraging. This brings home some idea of the increasing competition for jobs already too few to go around, and of the increasing premium on physical fitness.

Workmen's compensation is our first broad social experiment in finding a sound economic basis for the care of some part of the misfortune of physical disability. Its operation, together with other new conditions of competitive industry, confronts us with another kind of "industrial accident". The loss of a job, or the failure to find one because of physical unfitness is the most tragic accident that has come out of our industrial system. The next task for us seems to be finding some reasonable plan for compensation and prevention of this kind of "industrial accident". Individual health, however, can only in small part be promoted by legal or other social program. Health as the surest title to the benefits of a satisfying job must consist in an effectual personal hygiene based upon a realization of the oneness of health and economic worth. This is just one of the sobering health lessons of business.

A few weeks ago I visited a modern factory in Boston with a Chinese physician who is to have a share in organizing a health program for his country. He was a most thoughtful visitor. He walked slowly about one complex machine after another studying its ingenious design and operation; now and then he paused and slowly shook his head in oriental solemnity. At one machine operated by a single girl the manager of the plant said to my Chinese companion: "In Shanghai there is a factory where that operation is done entirely by hand; one Chinese girl can make two thousand of those parts in a day." Then, turning to his own machine operator he asked: "How many can you make in a day?" "Sixty thousand," was the reply. "There," said the manager, "you see it takes thirty Chinese girls to do what one American girl can do." The Chinese physician smiled and again shook his head in silence. I venture to guess that with him, as with me, admiration was a little dimmed by misgivings from the thought that if that machine were introduced into China today, at least thirty girls would be competing for the job of operating it; and the one chosen would be some bright-eyed, healthy

Chinese girl, like her alert, competent American sister now operating the machine. For even mechanical America which built the machine has not yet finished the job. With all its ingenuity it has not yet invented the social complement of the machine to answer the question: "What of the other twenty-nine girls?"

Just now we are distrustful, even fearful of the machine. This is not the first time that sentiment has strayed from the path of judgment in blaming mere things for troubles within ourselves. We must not forget that the machine is a thing designed and made and operated by man to effect a certain purpose. Upon him rests the responsibility. We have still much to learn about the social values of machinery. Some of our thinkers have begun to imagine a public hygiene centered in the need of an appropriate and satisfying job for every individual of whatever capacity. It is a splendid purpose. There is no cause to fear that the pursuit of it will destroy the stimulus to the highest type of human ability; for in adapting and maintaining our machine system to provide an appropriate job for every individual of the rank and file, there certainly will be need for the best of medical judgment and of engineering skill, and for finance and governmental control and countless other functions of the highest caliber.

Women usually regard machinery with indifference or contempt. It is hard to explain why; for it is probably true that women are, and always have been, the chief urge to the invention of mechanical devices to amplify man's natural abilities. Solomon, at great cost of materials and transportation and the labor of thousands of the most skilled mechanics of his time, built a splendid palace to gratify his favorite princess. Dr. Abraham Myerson has remarked in one of his lectures that, if standards of civilization were from today left entirely to men, in two or three generations we should all be living in tents.

Thus, it is not only women engaged in business as workers or executives that have a share in determining the health of business. For hazards of working conditions and hours and wages and jobs— or no jobs— and other things affecting personal and social health have a very direct relation to the things that are manufactured because women decide they are important to life; and women's desires determine standards, not only for trade in hats and gowns and cosmetics, but also in buildings and automobiles and airplanes and locomotives and ships, in fact in almost everything that machines are designed to make or do. Also, in that most hopeful part of the field of public health, by virtue of their individuality, women as mothers and big sisters and nurses and teachers have the first and most precious opportunities in rearing new generations of healthy bodies and wholesome ideas of the business of living.

RADIOLOGY CLINICS URGED TO COMBAT CANCER

Professor Costa Forsell of Stockholm, speaking before the third International Congress on Radiology at the Sorbonne on July 27, declared the knife can cure only 10 per cent. of cancer victims, according to an Associated Press despatch to the *Boston Herald.*

Ninety per cent. of cancer sufferers need other treatment, the noted scientist said, and in some of these cases, which would otherwise be without hope, permanent cures are obtained by radiology. These permanent cures may be effected in about 10 per cent. of cases, he said, while in another 15 or 20 per cent. complete disappearance of symptoms, indicating at least a retarding of the disease, is obtainable, and in 50 per cent. of all cancer cases radiology is found helpful.

An operation, he said, is still the favorite method in 12 per cent. of cancer cases, but he predicted a decreasing use of the knife. He admitted, however, that radiology is not useful in many cases of internal tumors.

Professor Forsell advocated the development of radiological clinics in connection with all central hospitals as a method of fighting the disease, and, declaring he was basing the advice on his experience in Sweden, said a radio-therapeutic clinic, with four or five grams of radium and the necessary machines, in the big hospitals, can greatly reduce national cancer mortality.

He advocated intensive propaganda among doctors, dentists and nurses working with local clinics but less effort to instruct the general public.

SCARLET FEVER SPREADS TO MORE ALASKAN VILLAGES

The spread into scattered localities of scarlet fever which a few days ago had taken the lives of eleven natives at Nashagak village was reported in Associated Press messages from the region on July 31. Nashagak village is on the north side of Bristol Bay.

MORTALITY RATES

Telegraph returns from 82 cities with a total population of 36,000,000 for the week ending July 25, indicate a mortality rate of 10.3 as against a rate of 11.9 for the corresponding week of last year. The highest rate (17.0) appears for Richmond, Va., and the lowest (5.0) for Somerville, Mass. The highest infant mortality rate (12.3) appears for Atlanta, Ga., and the lowest for Duluth, Minn., Kansas City, Kans., Lynn, Mass., Peoria, Ill., St. Paul, Minn., Salt Lake City, Utah, Somerville, Mass., and Yonkers, N. Y., which reported no infant mortality.

The annual rate for 82 cities is 12.7 for the 30 weeks in 1931, as against a rate of 12.6 for the corresponding weeks of 1930.—*Issued by the Bureau of the Census.*

TREATMENT OF HEAT STROKE

Death occurs in 40 per cent. of all cases of sunstroke or heat prostration within 24 to 36 hours, according to information just obtained from Dr. Shirley W. Wynne, Commissioner of Health of New York City, and made available by the Public Health Service. Patients must be treated immediately, it is declared.

Young people below normal strength, and old people, as well as those addicted to alcohol and those who are heavily clothed, are particularly susceptible to sunstroke or heat prostration, according to Dr. Wynne.

When a person in the sun feels a peculiar sort of headache and becomes dizzy or nauseated, or notices that his skin is hot and dry and that he is not perspiring as usual, it means that this person must get out of the sun at once or that he suddenly will become unconscious, Dr. Wynne explains. Additional information provided by the Health Commissioner and obtained at the Service follows:

Sunstroke or heat stroke must be treated quickly. A doctor should be called, or the victim should be removed at once to a hospital. The temperature of the patient must be lowered. Ice water, ice packs, cold sprays, ice bags and ice enemas are used until the temperature falls to 102 degrees, after which cool sponges often are applied. The temperature, however, should be watched carefully, because it must not drop below normal.

Failure of memory and loss of mental power frequently follow attacks of sunstroke. A person who has suffered sunstroke must not exert himself for many days afterwards, inasmuch as he is susceptible to other strokes, if he is not careful.

Sunstroke may first of all be avoided by keeping out of the hot sun, but if being in the sun is necessary, hats should be worn, or sunshades should be carried.—*United States Daily.*

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1930 AND SEVEN YEAR AVERAGE

MONTH ENDING JULY 25, 1931

Diseases	1931 Week ending July 4	1931 Week ending July 11	1931 Week ending July 18	1931 Week ending July 25	Average cases reported for week corresponding to July 25 for past seven years	1930 Week ending July 5	1930 Week ending July 12	1930 Week ending July 19	1930 Week ending July 26
Anthrax	—	1	—	—	—	—	—	—	—
Cerebrospinal Men.	2	1	—	—	1	1	1	5	2
Chicken Pox	31	30	14	12	13	30	11	20	9
Diphtheria	10	5	8	9	16	5	1	20	6
Dysentery Amoebic	—	—	—	—	—	—	—	—	1
Dysentery Bacillary	—	—	—	1	—	—	—	—	—
Encephalitis Epid.	—	1	—	2	—	1	—	—	—
German Measles	—	1	3	3	2	14	11	8	3
Influenza	1	—	1	—	2	—	1	1	—
Malaria	—	—	—	1	—	—	—	1	—
Measles	131	110	133	55	42	20	20	17	8
Mumps	15	34	7	20	7	19	16	12	7
Paratyphoid Fever	2	—	—	—	—	—	—	—	—
Pneumonia (Broncho)*	12	12	7	6	8	4	6	4	8
Pneumonia (Lobar)	4	6	7	8	9	13	10	14	8
Poliomyelitis	2	7	5	11	2	—	—	—	4
Scarlet Fever	22	19	16	9	12	16	7	8	10
Septic Sore Throat	1	3	1	—	—	—	—	—	—
Tetanus	—	1	—	—	—	—	—	1	—
Trichinosis	—	1	—	—	—	—	—	—	—
Tuberculosis (Pul.)	29	27	26	48	35	22	13	42	17
Tuberculosis (O. F.)	3	5	3	6	3	1	1	3	4
Typhoid Fever	1	1	4	1	2	—	1	2	2
Undulant Fever†	1	1	1	—	—	1	—	1	—
Whooping Cough	74	63	70	58	56	21	38	29	46
Gonorrhea	47	25	26	30	27	21	16	32	13
Syphilis	54	37	24	27	27	30	31	56	19

*Made reportable January 1, 1925.
†Made reportable August 14, 1928.

Remarks: No cases of Asiatic cholera, glanders, plague and yellow fever during the past seven years.

THE SEVENTEENTH ANNUAL REPORT OF THE PETER BENT BRIGHAM HOSPITAL

There is always material of interest in the Annual Report of the Peter Bent Brigham Hospital. In addition to the dry statistics which must be published, it is pleasant to note an occasional comment by one of the members of the staff. Dr. Harvey Cushing, Surgeon-in-Chief, calls our attention to Dr. Homans' "Textbook of Surgery", which was largely a product of the Harvard Medical School and the Peter Bent Brigham Hospital. It needs no further attention here as a review and editorial comment have already appeared in the *Journal*. Dr. Cushing feels that Homans' "Surgery" will take its place in medicine beside Osler's "Medicine", an opinion which has been expressed by many others who have profited by reading this book. The Surgeon-in-Chief also writes amusingly of his recent impression while a patient at the Hospital and concludes, very justly, with the following comment: "However long one may have been in this business of passing most of his time in a hospital, whether on duty at the bedside or as a patient in the bed, he ends each day in renewed wonder that so many people, administrators, doctors and nurses, even orderlies and scrubwomen, so willing and eager to be of help, can go on day after day with spirits unflagging, offering cheer and encouragement and bringing consolation, comfort and hope as well as intelligent care to the succession of those poor souls out-of-luck to whom the hospital with all its inconveniences and regulations is a veritable haven of refuge. These things, too, are worth learning about and they can never be fully appreciated and understood unless viewed from the other side of the looking glass."

The Physician-in-Chief, Dr. Henry A. Christian, also has an unusual report. He first calls to our attention the importance of a first-class hospital for chronic disease, where patients could be adequately cared for and investigative work take place comparable with that which is done in hospitals for acute disease. He thinks that perhaps the greatest need today in the way of hospitals is for such an institution and that "to it should go the well-to-do and the poor. As developments in medicine and surgery have rendered the hospital the best place to be acutely ill in, whether rich or poor, so in the hospital for chronic illness will be found therapeutic measures of all sorts which cannot be provided in the homes of even the very well-to-do. Long since has this been recognized in the care of the tuberculous and the insane. It is equally true of all other sorts of chronic disease.

"Strangely enough, though the need is well nigh universal, little has been done anywhere to create such an institution as I am describing. For one with great wealth seeking to accomplish a great good for many people such a philanthropy should appeal. There is opportunity to create a new type of institution greatly needed in our land. I know of nothing that would yield a greater return. It easily would become a pioneer institution, a leader showing the way for other institutions to follow. It would need very large sums of money to make possible an ideal development, more money than so far probably has been put into a single institution at its inception."

Dr. Christian's report, in addition, deals with the early history of the Peter Bent Brigham Hospital, especially the formation of the medical staff, in 1910-1912. He reproduces some interesting letters exchanged between the late Dr. Francis W. Peabody and himself, which should be of interest to all. These notes again emphasize Dr. Peabody's clear-cut ideas in regard to both the teaching and the practice of medicine.

A splendid tribute to one of the House Officers, Homer Mayo Boyden, who died a tragic death from agranulocytic angina, February 3, 1931, written by Dr. Christian, forms a special section of the Report.

In the report of the Pathologist, Dr. S. B. Wolbach, one notes that the Brigham Hospital still maintains its high percentage of autopsies, 64.4 per cent. The record has never fallen below 50 per cent., except for the two war years, 1918-1919. Included, of course, is the neurosurgical service, with its splendid mark of 93.3 per cent. Such figures indicate a hospital of high standard.

BONE DEMONSTRATION

The Surgical Pathological Laboratory of the Johns Hopkins Hospital is arranging a bone demonstration to take place in the Engineering Hall of the Johns Hopkins University at Homewood, on Charles Street, on September 14, 15 and 16. Further information can be obtained from Miss Maude E. Walkers, Surgical Pathological Laboratory, Johns Hopkins Hospital, Baltimore, Maryland.

ILLINOIS HAS LOWEST INFANT MORTALITY RATE

Illinois babies experienced their best health year in 1930, according to an announcement of the State Department of Public Health, which pointed out that the infant mortality rate of 56 per 1,000 births was by far the lowest ever registered in the State. It was more than 9 per cent. under the 1929 rate, previously the lowest on record, and 36 per cent. below the 1920 rate. The number of infant fatalities in Illinois last year was 7,152.

STUDY OF NARCOTIC NEEDS

The quantity of narcotic drugs necessary to meet the scientific and medical needs of the United States is being ascertained in a preliminary study being conducted by the Division of Mental Hygiene, of the Public Health Service, in coöperation with the Bureau of Narcotics, according to the *United States Daily*.

Undertaken as provided in the Act of May, 1930, the study is being made to obtain data to be used as the basis of measures to be proposed for regu-

lating the quantity of narcotic raw materials which may be imported into this country, it was explained.

The information is being obtained by the Public Health Service from reports on the manufacture and distribution of narcotic drugs submitted to the Bureau of Narcotics. This work is in accordance with the International Narcotic Agreement adopted in 1912. This agreement, however, was considerably amplified by the convention adopted a few weeks ago at Geneva by representatives of various countries, including the United States.

THE CONVALESCENT HOME OF THE CHILDREN'S HOSPITAL

The Convalescent Home of the Children's Hospital, located on Forest Street in Wellesley Hills, has recently completed the third year of its training school for Nursery Maids. This course, under the supervision of Miss Lilian Guillod, the Superintendent, is offered to any girl who has completed two years of high school work and is over 18 years of age. The girls are admitted into the school in groups of 12 to 15, twice a year, in October and March.

The practical and theoretical experience obtained from this course is of inestimable value to any girl and the graduates have very little difficulty in securing good positions. The course of practical work is as follows:

5 months including one month night duty on general wards.

3 months in the solarium, which includes care of daily dressings and sun treatment.

3 months' care of infants including preparation of diets up to two years.

To this has been added a course of instruction in diets and preparation of foods for the older children.

1 month relief work, including some time in the isolation ward with special instruction in isolation technique.

15 hours in hand work, games and songs in the school.

The theoretical work consists of 45 hours of instruction in bedside nursing.

18 hours of lectures: medical, surgical and orthopedic, also including growth and development of the infant.

In December, 1930, a new building was opened for isolation purposes. Not only has this improved the efficiency of the Home with respect to the children, but it also gives the nursery maids the added opportunity of learning the technique and method of handling children with regard to contagious diseases.

The babies' ward, which was opened last year, is proving a boon to the Children's Hospital, and also has given to the girls the necessary experience and training in the care and feeding of infants.

The officers of the Convalescent Home are: President, Mrs. George H. Monks; Vice-President, Miss Mary B. Lothrop; Treasurer, Mr. Samuel H. Hooper; Assistant Treasurer, Mrs. I. McD. Garfield; Secretary, Mrs. Robert Amory.

DEATHS FROM TUBERCULOSIS DROP

According to a statistical report made public by the Metropolitan Life Insurance Company, deaths from tuberculosis and diphtheria in the United States and Canada decreased materially in the first six months of 1931 as compared to the corresponding period a year ago.

Among industrial policyholders west of the Rocky Mountains the death rate for the half year has been 6.3 per cent. lower than for the corresponding period of 1930. Among insured Canadians, the improvement has been even greater, or 8.2 per cent. Among the great bulk of the insured wage earners who live East of the Rockies, however, the mortality rate has increased by 2.6 per cent.

The situation in respect to cancer is considered to be particularly disturbing, and there has been considerable rise in the death rate for diabetes, heart disease and cerebral hemorrhage. The mortality rate for suicides, homicides and automobile accidents has also risen somewhat.

RECENT DEATH

MACKIE—Dr. William Charles Mackie, Medical Examiner of the eighth Norfolk district for the past twelve years, died suddenly of heart disease at his home in Brookline, August 1, 1931, at the age of 69.

Born in Boston, October 1, 1870, he was the son of Dr. William Basilio Mackie, of that city, a Fellow of the Massachusetts Medical Society, who died in 1913. William Charles received an A.B. at Harvard College in 1895 and an M.D. at Harvard Medical School in 1898. Then he served as house officer at Worcester City Hospital, joining the State Medical Society from Worcester in 1899 and moving to Boston the next year. He settled in general practice in Brookline in 1907 and in time became associate medical examiner.

He was a member of the Harvard Club and of the Royal Arcanum.

Dr. Mackie is survived by his widow and by one daughter.

NEWS ITEMS

DR. BARNES RESIGNS AS MEDICAL EXAMINER—Dr. F. R. Barnes of Fall River, medical examiner for the southeastern section of Bristol County, has submitted his resignation to Governor Ely asking that it be made effective August 15.

Dr. Barnes' term would have continued for two more years. He was appointed associate medical examiner by Governor Coolidge in 1919, reappointed by Governor Fuller in 1926 and succeeded Dr. William H. Blanchette as medical examiner in 1927.

PORTRAIT OF LINDA RICHARDS—Students of the Training School of the New England Hospital for Women and Children, the Transcript announces, have presented the school with a portrait of Linda Richards, the first graduate of their training school and the first graduate nurse in America. The project has been financed entirely by the students, under the leadership of the senior class.

The portrait was painted by Miss Cordelia L. Brooks, a student at the School of the Boston Museum of Fine Arts, from a photograph of Miss Richards. The keen sense of humor, the quiet judgment and the professional severity which were marked characteristics, are all to be seen and felt in the very natural expression of her face. The portrait hangs in the living room of the nurses' residence.

DR. DEMING SAILS—Dr. Julia Deming, psychiatrist at the New England Home for Little Wanderers, has sailed for Europe to attend the International Psychiatric Conference at Interlaken, Switzerland. At the conclusion of the conference she will spend some time in Vienna working with Dr. Anna Freud.

DR. EDWARD L. CREEDEN—Dr. Edward L. Creeden, acting director of the Bureau of Preventable Diseases of the Department of Health of New York City, died on July 31 in the Presbyterian Hospital following an operation performed the night before.

NOTICES

COMMUNITY HEALTH ASSOCIATION

Removal

The Community Health Association announces the removal of the central office to 581 Boylston Street, Boston, Mass. Telephone: Commonwealth 1700.

A CORRECTION

We acknowledge the criticisms of Drs. Finkel and Albright on the editorial "The Aschheim-Zondek Test" which appeared in this *Journal*, volume 204, page 162. It was not made clear in the editorial that the reaction obtained from the urine of carcinomatous patients was only the "Prolan A" reaction. Incidentally, Dr. Albright informs us that in the series of Aschheim-Zondek tests which he has performed at the Massachusetts General Hospital he has not obtained a positive Aschheim-Zondek test from any case of carcinoma in the absence of pregnancy.

UNITED STATES CIVIL SERVICE EXAMINATION

The United States Civil Service Commission announces the following-named open competitive examination:

Physician (Cancer)

Applications for the position of physician (cancer) must be on file with the U. S. Civil Service Commission at Washington, D. C., not later than September 4, 1931.

The examination is to fill a vacancy in the Veterans' Administration, for duty at Hines, Ill.

The entrance salary is $3,800 a year.

Competitors will be rated on their education, training, and experience.

Applicants must have been graduated from a Grade-A medical school within twenty years of the date of the close of receipt of applications, and must have had at least three years of postgraduate experience in the practice of medicine, including at least one year in the diagnosis and treatment of malignant diseases, involving the use of radium and radium emanation, the histopathology of tumors, and clinical or laboratory research.

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city or from the United States Civil Service Commission, Washington, D. C.

NOTICES OF MEETINGS

CLINICAL CONGRESS OF THE CONNECTICUT STATE MEDICAL SOCIETY

The seventh clinical congress of the Connecticut State Medical Society will be held in the Sterling Hall of Medicine, Yale University, and the New Haven Hospital on September 22, 23, and 24. Among the problems to be discussed are diseases of the digestive tract, diphtheria, treatment of fractures, maternal health, and the cost of illness. Morning sessions will be devoted to presentation of papers and discussions, afternoon sessions to laboratory demonstration of the same subjects, and evening dinner meetings to addresses by well-known authorities on subjects of general interest.

Dr. Linsly R. Williams, director of the New York Academy of Medicine, will address the dinner meeting September 22 at the New Haven Lawn Club on the subject "Fundamental Conditions in Medical Economics." The speaker at the dinner meeting on the following evening will be Dr. Theodore T. Zuck, of the Maternal Health Association, Cleveland, Ohio, who will speak on "Maternal Health in Relation to Race Betterment."

Among those who will take part in demonstrations and discussions are Dr. E. Monroe Bailey, chemist-in-charge, Connecticut Agricultural Experiment Station; Dr. Daniel F. Jones, associate in surgery, Harvard Medical School; Dr. Thomas R. Brown, associate professor of clinical medicine, Johns Hopkins University; Dr. William H. Park, director of laboratories, New York City Department of Health; Dr. Edward S. Godfrey, director of the division of communicable diseases, New York State Department of Health; Dr. Stanley H. Osborn, Connecticut State Commissioner of Health; Dr. William F. Wild, Health Officer, Bridgeport; Dr. John L. Rice, Health Officer, New Haven; Dr. Philip Wilson, associate

professor of orthopedics, Harvard Medical School; Dr. Clay R. Murray, assistant professor of surgery, College of Physicians and Surgeons, Columbia University; Dr. William B. Terhune, associate medical director, Austen Riggs Foundation; Dr. David R. Lyman, director of Gaylord Farm Sanatorium; Dr. Robert L. Dickinson, secretary of the National Committee of Maternal Health; Dr. Josephine Hemenway Kenyon; New York; Dr. William H. Cary, New York; and Drs. Bert G. Anderson, Agnes R. Beebe, Francis G. Blake, E. Irene Boardman, Louis N. Claiborn, George R. Cowgill, Charles S. Culota, Ethel C. Dunham, Samuel C. Harvey, Jean Hippolitus, Raymond Hussey, Eugen Kahn, William A. LaField, Joseph I. Linde, Lafayette B. Mendel, Elizabeth Nickerson, Winthrop M. Phelps, Grover F. Powers, Albert J. Sullivan, James D. Trask, and C.-E. A. Winslow, all of New Haven.

Dr. Creighton Barker, 129 Whitney Avenue, New Haven, is in charge of registration and publicity, and will answer all communications regarding the clinical congress.

The clinical congress was organized seven years ago, by the Connecticut State Medical Society, as an educational agency for practicing physicians. Over one-third of the physicians in Connecticut, and many from other states, are availing themselves each year of this opportunity to keep in touch with developments in various fields of medicine. This year a greater emphasis than ever before is being placed upon practical demonstrations. Afternoon sessions will be given over to laboratory demonstrations of the subjects discussed during the morning sessions. All physicians are invited to attend.

NEW ENGLAND SURGICAL SOCIETY

Change of Date

The 1931 Meeting of the New England Surgical Society will be held Friday, September 11, and Saturday, September 12, at Black Point Inn, Prout's Neck, Maine, eight miles from Portland.

The Portland Committee of Arrangements has reserved the entire hotel at Prout's Neck for the meeting and all exercises except the clinics will be held there. This is a new hotel with the very finest of accommodations, including golf course, tennis, swimming, etc.

The rates for single person are $6.00 a day, which includes room and breakfast.

Write for accommodations to Black Point Inn, Prout's Neck, Scarboro, Maine.

Program

Friday, September 11

8.30 to 10 A. M.—Operative clinics in new wing of Maine General Hospital.

10 A. M. to 12.30 P. M.—Dry clinic in amphitheatre of Maine General Hospital.

12.45 P. M.—Luncheon at Maine General Hospital.

2 to 5 P. M.—Surgical papers at Black Point Inn, Scarboro, Maine.

5 P. M.—Tea (?) at Black Point Inn Cottage.

7 P. M.—Banquet at Black Point Inn.

Saturday, September 12

9 A. M. to 12 M.—Surgical paper at Black Point Inn.

1 P. M.—Shore Dinner to be given by the Maine members of the Society at Pillsbury's, Pine Point, Maine.

SOCIETY MEETINGS
CONGRESSES AND CONFERENCES

Aug. 31 - Sept. 4 — Neurologists will meet in Berne, Switzerland. See page 896, issue of April 23.

September 2, 3, 4 — American Academy of Physical Therapy. See page 215, issue of July 23.

September 11-12—New England Surgical Society. See notice elsewhere on this page.

September 14-17—The American Public Health Association. See page 632, issue of March 19.

September 22, 23, 24—The Clinical Congress of the Connecticut State Medical Society. See notice on page 365.

October 5, 6, 7, 8—American Congress of Physical Therapy. See notice on page 272, issue of July 30.

October 12-16—An Announcement of the Clinical Congress of the American College of Surgeons. See page 1175, issue of May 28.

October 19-22—The Interstate Post Graduate Medical Association of North America. See page 1125, issue of May 21.

October 19-30—Graduate Fortnight of the New York Academy of Medicine. See page 1230, issue of June 4.

April 4-8, 1932—The American College of Physicians. See notice on page 1232, issue of June 4.

DISTRICT MEDICAL SOCIETIES

Bristol North District Medical Society

September 17—Details to be announced.

BOOK REVIEW

The Treatment of Asthma. By A. H. Douthwaite. William Wood & Co. Price $2.50.

This little volume of 158 pages easy to hold and easy to read is written by an Englishman at Guy's Hospital. The author hopes "that this book presents in an assimilable form all facts and theories of practical importance which are relevant to the subject". And the hope is realized. The book lays stress on the physiology of asthma, discussing the direct and reflex causes of bronchoconstriction. It describes briefly the studies of metabolism recently made in England and it describes briefly the development of the late changes in the lungs and heart in asthma.

The clinical aspects are well handled although the small size of the book excludes many details. Thus, the clinical classification of asthma deserves more attention to bring out the fact that the cases fall into more than two well-defined groups.

It is good to see that the American reliance on skin tests and specific allergens is softened by the greater emphasis on general conditions, focal infections, reflex causes, and physical treatment. The discussion of drugs includes many helpful suggestions.

Only 46 references are given and many familiar names are omitted. As a brief survey of the subject, the book serves its purpose. The busy practitioner can learn a great deal from it.

The New England JOURNAL of MEDICINE

FORMERLY THE BOSTON MEDICAL AND SURGICAL JOURNAL

Official Organ of The Massachusetts Medical Society
The New Hampshire Medical Society — The Vermont State Medical Society
The New England Surgical Society — The Boston Surgical Society, Inc.
The New England Pediatric Society — The New Hampshire Surgical Club
The New England Obstetrical and Gynecological Society
And The Neisserian Medical Society of Massachusetts

OWNED AND PUBLISHED BY THE MASSACHUSETTS MEDICAL SOCIETY

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Volume 205 Number 8 — Domestic $6 per Annum, 25c per Copy; Canada $7.04, Foreign $7.56 — AUGUST 20, 1931 — Published Weekly in Boston at 165 Newbury Street

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The Massachusetts Medical Society

The next Annual Meeting of the Massachusetts Medical Society will be held in Boston, June 8, 1932, "unless otherwise ordered by the Council".

OFFICERS AND STANDING COMMITTEES ELECTED BY THE COUNCIL, JUNE 9, 1931

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